











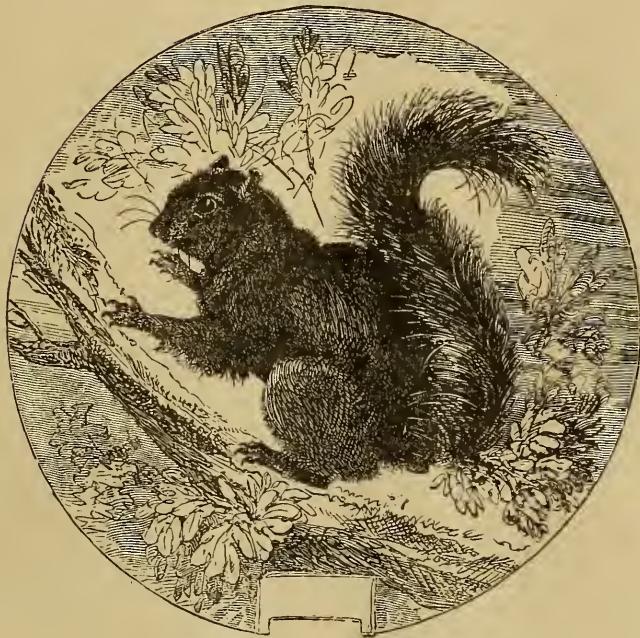


# LITTLE FOLKS

IN

## FEATHERS AND FUR

AND OTHERS IN NEITHER

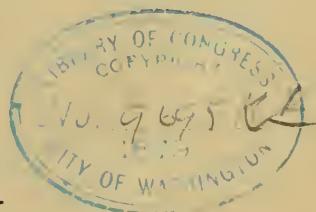


BY

OLIVE THORNE MILLER

*Mrs Harriet Mann Miller*

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## PREFACE.

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To begin with—Dear unknown Reader,—this book makes no pretensions to be a scientific work. Indeed it is scrupulously otherwise. Long words are carefully left out, nothing is said of scientific classification, and very little of scientific names.

It is merely a collection of sketches, telling what is interesting for any-one to know, about a few of the millions of creatures on our globe. It was written for little people, but will not be without interest to any-one who is curious about the ways of our little neighbors, and who does not already know too much about them.

Far be it from me to intrude upon the field of the scientific naturalist. I merely take his discoveries, and translate them into the vulgar tongue, that every-one may enjoy the delightful results of his work.

There is one thing more. I have been very careful to have the best authority for every statement I have made, and if any young reader goes from this little book to its big scientific predecessors, he may find much to learn, but I hope will have nothing to unlearn.

OLIVE THORNE MILLER.

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### *THE BABIES THAT LIVE IN A BALL.*

Isn't that a droll place to live?—And the ball not so big as a croquet ball, and six or eight, or more, little pink mouse babies inside!

Of course they're not so big as the baby at your house. In fact the mother herself weighs only one sixth of an ounce, and isn't half so big as the little brown mouse you sometimes see, scudding behind a box in the pantry, or scampering over the floor in the attic.

She isn't brown like a common mouse either ; she is reddish on the back, and soft silky white on the under part of the body. Her ears are rather short, and on the whole she is an elegant little creature.

How such an atom of a builder manages to weave this beautiful ball, of narrow grasses, hang it firmly to the wheat straws, and put her babies in,—and above all, how she contrives to get in and feed them, when the whole ball is just stuffed with babies, as tight as sardines in a box,—is what even the wise men don't know yet, for she's very shy, and don't like to be watched.

In the picture you see Mamma Mouse sitting on the cradle, taking a lunch of an insect she has caught, while Papa Mouse is on the watch for one for himself. Do you see his tail curled around the wheat stalk ? Well, the tail is one of the most useful things a harvest mouse has. It is as long as his whole body, and he can hold on with it as well as though it was a hand.

Mr. and Mrs. *Micromys Minutus*—that's their name in the big books, you must know—do not spend their winters in this airy home ; by no means ! They have a snug, warm house under ground, which they also make for themselves. It has a large living room, with long halls leading to it, and in this cozy place, in warm beds of hay or straw, the whole family go to sleep when the days get cold, and never open their eyes, or take a breath, till the spring comes back, and the sun shines warm on the ground.

These pretty little creatures have other relations besides their brown cousins that nibble the cheese in our pantries. There is the Field Mouse, who builds his ball of a house on the grounds, among the grass, and his winter quarters underground, with storehouses where he lays up a stock of food for cold weather.

This little mouse has been made quite famous by having a poem written about him. Burns, a Scotch poet, in plowing a field, tore up a field mouse's nest, and feeling sorry to turn the poor little mousie homeless out in the cold, he wrote a pretty little poem about it. He says, in his funny Scotch way,

“ That wee bit heap o' leaves an' stibble  
Has cost thee mony a weary nibble !  
Now thou's turn'd out for a' thy trouble.”

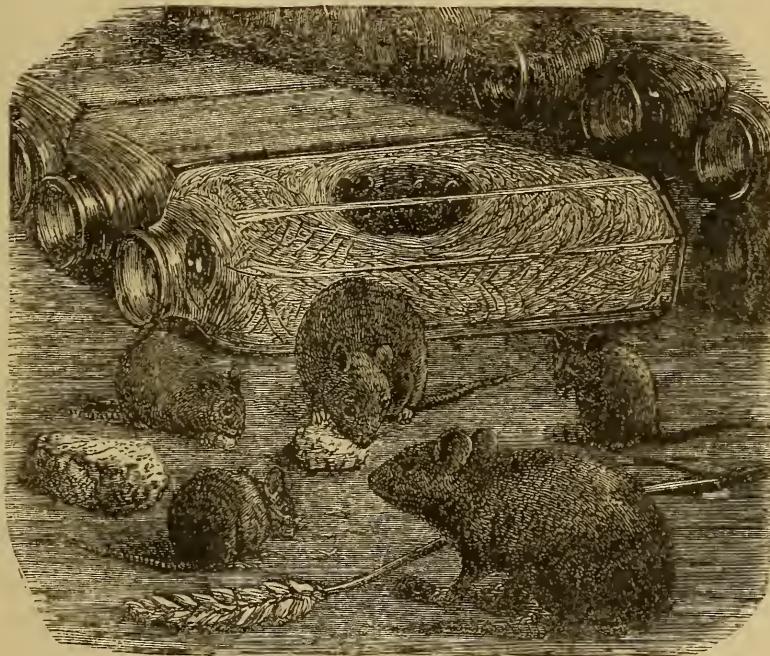
This little fellow is very fond of cherry stones, and he sits up like a squirrel to eat them, nibbling off one end and digging out the meat. He don't sleep so soundly as some of his cousins ; indeed his

little tracks are often found on the snow, and long tunnels that he has made, under it.

One of the field mouse tribe that lives in Siberia, stores up such quantities of dried roots and other food to last through the long dreary winter of that country, that the half starved people who live there too, hunt out his storehouses, and carry off most of the food for their own use.

But after all, none of the mouse family are a bit wiser or prettier than the little brown fellows who live in our houses. They too make their nests in the shape of a ball, and they choose funny places to put them.

I have read of several droll mouse houses. One was built in an empty bottle, which lay on a high shelf. Another was under a sitting hen's nest, and the saucy little builder nibbled the feathers off the tail of the patient old hen, to make a feather bed for her babies.



The oddest mouse nest I ever heard of was made in a loaf of fresh bread, standing on a pantry shelf. The little brown mother

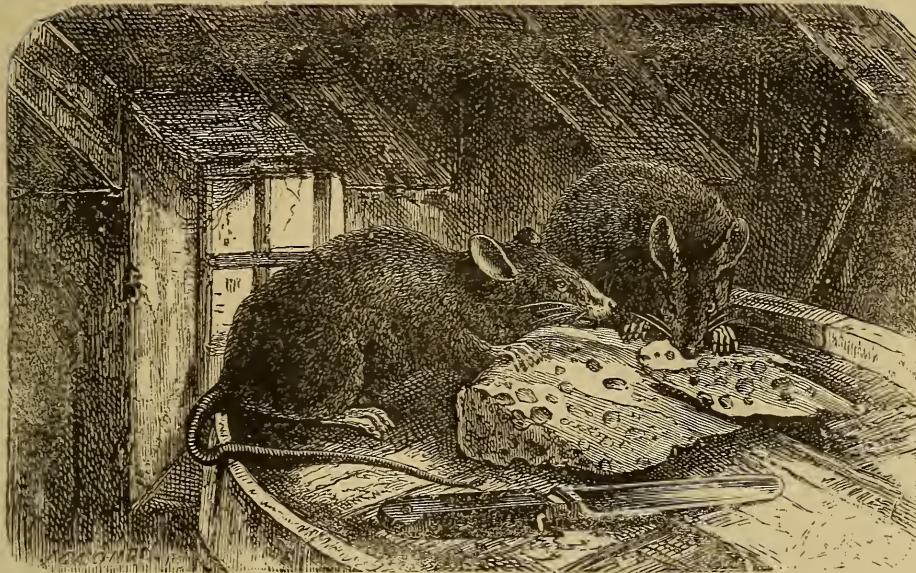
was so industrious that in less than two days she dug out the inside of the loaf, cut up some paper for lining, made her nest and put nine little pink babies in it.

Poor little mousie! I'm afraid the crust's brown walls were not a very safe home for the wee babies.

Perhaps you have heard of singing mice. Not long ago I read a true story of a man who heard one about the house for some days, and at last caught it. It was not a house mouse; it was a field mouse, and its famous singing was much like the song of a cricket. He had it as a pet for a year or two. Several times it got out, but did not know enough to stop singing, and so was caught again. But at last it ran away, and they never saw it again.

All these little fellows belong to the family of *Rodents*, because they gnaw and nibble their food. I don't see why they couldn't just call them gnawers—and done with it—for that's what the word Rodents means.





### *THE BROWN BABY WHO LIVES IN THE BASEMENT.*

I wonder how you'd like to be one of the brown babies who live in our basement—and yours, too, no doubt.

How would you like it, every time you put your head out of doors, to find a fierce lion, or sly, bloodthirsty tiger, waiting to snap you up? Would it be pleasant to have to work hard for every dinner you ate, often being obliged to dig through a wall before you got anything?

How would you enjoy having the world filled with monstrous giants, who took delight in chasing and killing you?

Well, that's the life the poor brown baby lives. Do you suppose he likes it any better than you? And it's just the same with his mamma and papa, brothers and sisters, and, in fact, the whole family.

To be sure, he's nothing but a rat. But then you're nothing but a child, and his dinner and his life are as dear to him as yours are to you.

But then he steals our food, did you say?

Well, that's only because he must have something to eat. Besides I don't believe he was ever taught any better. In fact, I wouldn't be surprised if he thought men were made on purpose to collect food for him.

Then he gnaws holes in our walls.

That's true, and it's very troublesome to us; but when you know the whole truth about this gnawing business, I think you'll be sorry for him.

You see, the rat's teeth are very singular things. In the first place, they are shaped like a wedge; the inside of them is soft and easily worn off, while the outside is very hard enamel. But the strangest thing is that they grow all the time. If you should feed him as much as he could eat, he would still have to gnaw something hard to keep his teeth worn off. If he didn't, they would grow up into the mouth above and kill him at last.

Rats have been found who had lost one tooth. The tooth opposite, having nothing to gnaw against, had grown out to a fearful length. In case of a lower one, it grew up into his skull. One that I read of (an upper tooth) was gradually pressed out till it fairly grew into the shape of a ring, sticking out of his mouth.

Did you ever know of a tame rat? If you went to Siam, you'd see plenty of them. They're fed and petted as you pet your kitten, lie by the fire, and jump into your lap like a cat or dog. They grow very large, and keep the house clear of their unfortunate wild relatives.

I've heard too of another one that was tamed by a stage-driver. His business was to guard his master's dinner-basket, which was carried in the stage.

You needn't think this brown baby is a nobody. He has his history, as well as you. We don't know what legends the old gray rats tell to the young ones in the long winter evenings; but we do know what men tell about them.

It seems that, once upon a time, a great tribe of rats lived in Persia, in roomy houses, which they made underground. There they might have stayed to this day but for an earthquake, a hundred or two years ago. Feeling that their home was no longer safe, they decided to emigrate. They started west, like other emigrants, swam rivers, and came to settle in Europe. The people there did not like them, I suppose, any better than the buffalo likes those

who emigrate to the West in our country. But they stayed and made their homes there, nevertheless.

Rats are made useful in other ways besides as hunters. In China they are eaten, and in Paris their skins are made into gloves. In London they are a source of amusement, as well as profit. In that city and other large towns in England, there are professional rat-catchers—men who make it their business to go from house to house and clear out the rats. As a sign of their business, they wear a brass image of a rat, and they charge a certain sum for every one they catch. How they do it is a professional secret, for they don't kill them, but carry them off in bags to sell.

You don't know who would buy live rats; but that's because you never went to a rat-pit (and never will, I hope). The rat-pit is always in a low neighborhood, and is nothing but a sort of hole where rats are let loose and dogs sent in to kill them. Strange as it seems, crowds of low men and boys find pleasure in seeing the cruel sport, and are willing to pay for it. So the rat-catcher sells his animals by the dozen to the owners of the pits.

Rats have been trained to entertain an audience in another way. A troop of them was exhibited, a few years ago, in Europe, dressed like men and women, who walked on their hind legs, and went through a sort of play, one act of which was to hang a cat and dance round the body.

N. B.—The cat was a stuffed one.

These brown babies have white cousins called Albino rats. They have snowy white coats, and pink eyes. They are as lively as squirrels, and are kept as pets, whenever they are caught. They are extremely neat about their personal appearance, spending most of their time in cleaning their fur and washing their face.

They also have other brown cousins that live in California and build houses for themselves. Rats are always fond of society, you know, and these California fellows build regular villages. They select a nice place where trees are thick, and make a hut four or five feet high, shaped like an Indian hut.

Each house has five or six doors near the ground, besides numerous halls and passages leading away under ground. They are built sometimes of sticks and chips, and sometimes of bones.

### THE LITTLE RED STOREKEEPER.

He doesn't keep a store to sell goods—he only keeps a store for his own use; and he isn't much like other store-keepers, for he's the liveliest, happiest, friskiest fellow you ever saw—only four inches high, at that.

If you want to know what he is, I'll tell you: he is a squirrel, and he lives all over our country.

He has several titles. The men who make the books, and hunt up the most horrible names—though I must admit the names all mean something—call him *Tamias*, a Greek word, which means storekeeper. The common people where he lives call him the Striped Squirrel, and the Indians call him the Ogress Squirrel.

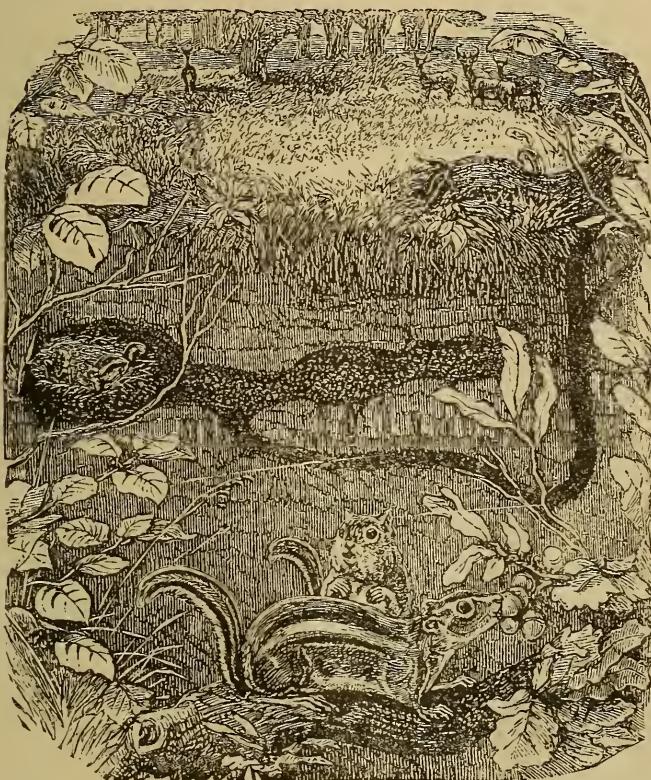
He has a splendid tail, as long as his body, and he looks very saucy, chattering away, as he delights to do, sitting on the ground, with his tail curled over his back. His coat is dark red, with four nearly black stripes from neck to tail.

Do you want to know why he is called storekeeper? Well, in the summer and fall, when seeds and nuts are ripe, he goes out every day, and fills two leather bags he has with food. Then he runs home, and empties the bags on a sort of shelf he has prepared in his very retired house.

Perhaps you wonder where he gets leather bags. They are given to him by the same Providence that gives him his beautiful long tail. He don't have to hang them over his shoulders as men do, because they are fastened just back of his mouth, and reach back to his shoulder. He don't have to tie up the tops of the bags, because they open into his mouth, just back of his teeth, and when he shuts his mouth he shuts both bags.

It is very funny to see him load up his bags. He crowds the food in, seeds, nuts, pieces of root, or any thing eatable, using his fore paws to pack them tight. When he reaches home with his load, it is quite as funny to see him empty them. He puts his fore feet behind the bags on the outside, and just crowds the whole cargo out, while he holds his mouth open, and lets it all drop on the floor. Then he packs it nicely away, for winter use, in his store-room. But I must tell you about his house. To get in you must go through a

very neat door under the roots of some tree or a fallen trunk. I think it will trouble you to get in, for the door is about as big as an auger-hole. However, if you could go in, you'd go down slanting a little way, and then come into about the cosiest room you ever saw.



need no food, but this little fellow is too lively for that. When the winds and snow of winter make it unpleasant to go out, Mr. Squirrel and his wife and babies—if his children haven't all set up house-keeping for themselves—retire to the cozy home, and spend a quiet winter, with plenty to eat. You may think such a life would be rather dull, without books and other amusements, but you know the highest delight of an animal is plenty of food and a comfortable bed. In the country, where beech-nuts grow, these little fellows often lay up their whole store of them. When I was a child, I had a present from a country boy of half a bushel of beech-nuts, all beautifully shelled, ready to eat, that were taken from one of the storekeepers' nests.

It is carpeted and lined all over with moss or dry leaves, and is as warm, and soft and nice as the daintiest squirrel could wish. His store-room is just out of his parlor, and has a sort of earthen shelf, where he packs away his winter food. In the picture the ground is cut away to show you the little home, its long halls, its store-rooms and the nursery full of babies. While in the fore-ground Mr. and Mrs. Tamias are out after their dinner.

Some squirrels sleep all winter, and

Although I was very fond of beech-nuts, and they were exquisitely neat, I could not enjoy them for thinking of the poor squirrel that had been robbed. If I had known where he lived, I would have returned them.

Did you ever see a squirrel eat? He sits up straight, takes a nut in his fore paws, and just nibbles the shell off. You can easily imagine that he must have very sharp teeth, and also that such hard work must dull them. How do you suppose he keeps them sharp? He has no grindstone or other tool. It is an exquisitely beautiful provision of Providence. His teeth are made of tough ivory, and coated on the outside with a thin surface of enamel, as hard as steel. Now, as he uses his teeth, the ivory wears off first, always leaving a sharp cutting-edge of the enamel.

I must tell you why the Indians call this merry little chattering by such a dreadful name as the Ogress, and why the Indian children think it brings bad luck to kill one.

You know Indians can't read, and during the long winter days have nothing to do but tell stories and eat. Ignorant people always are suspicious of what they can't understand, so they have a great many legends to account for every thing mysterious. To explain the black stripes on the little storekeeper's back, they have this legend:

Once on a time, long ago (of course), a terrible old woman, with teeth like a wolf and claws like a bear, who spends all her time doing evil, eating babies and such delightful things, and whom they call the Ogress, spied a young red-skin playing alone in the woods. He was nice and plump, and this horrid old woman wanted him for her dinner. So she coaxed him with a basket of flowers and berries, and just as she grabbed the poor baby, his father and mother saw him, too late to save him. There was only one hope: they fell on their knees, and prayed in agony to the Great Spirit that he would use his power, and deliver their baby from her clutches. The prayer was granted, and though the Great Spirit hadn't power enough to restore the baby, he turned him into a tiny red squirrel, and he slipped out of her hands, though four of her claws left marks on his back. If you don't believe it, you can see the marks on that squirrel's grandchildren to this very day.

If you were Indian children, that would be proof enough for you; but as you've had better teaching than the poor little redskins, I don't suppose you'll believe a word of it. And, I must admit, I don't believe it myself.

In Sumatra there are Squirrels living in groves that become quite tame. If you hold out your hand with crumbs in it, they will come down from the trees and take it from your fingers. That is because they have never been teased and killed by the people, so they have not learned to be afraid of them.

How long do you suppose Squirrels would be tame when you American boys could get at them?

There are several kinds of squirrels in our country, as you country children know well enough. No doubt you have had many a long chase after one of the saucy little fellows, only to see him leap from the top of the rail fence into the branches of a tree, and disappear among the leaves.

City youngsters who stand before shop windows to watch the pretty little creatures turning those frightful revolving cages, have little idea of their beauty in their native woods.

Perhaps the prettiest, and at any rate the oddest variety, is the flying squirrel, of which here is a picture.



The bright-eyed little fellow lying full length on a branch, and looking at you, looks like any other of his race, but in the climbing one you can see the edge of the loose skin which reaches from one

leg to the other, and you can see that when he stretches out his legs for a great leap, this skin spreads out, and presents a larger surface to the air, thus holding him up a little longer than if he had none. This is the only sort of a wing he has, and that is the whole of his flying,—simply a little bolder leap than the rest of his family.



*A BEAR WITH A BEDQUILT.*

It *is* a bedquilt, isn't it, if he always spreads it over himself when he goes to bed? I think so.

You never heard of such a bear? I dare say you haven't, because that isn't his whole name. His name is Ant Bear, and I guess you'd think it a good one if you could see him once when he finds a nice ant-hill to work on. You'd think he was made to eat ants—as, indeed, he was.

His fore feet are made with sharp claws, just right to tear open the hard houses of the white ants. And he's as fond of ants as you are of sugar-plums—strange as you may think it.

What I call his bedquilt is really his tail. A monstrous gray mat it looks like, large enough to cover him entirely up—and tuck in.

Then his nose is half as long as his body, so it can get into the ant-houses, you see. He has no teeth (he doesn't need them to eat such food with) and his tongue is small, and very long and sticky, and darts in and out so fast you can hardly see it, snatching up dozens of ants every time.

He has to be quick to get enough of them, for ants are not lazy themselves, you know.

When he lies down he looks droll enough. He is four or five feet long, and he tucks his long nose under his arm (suppose your nose was long enough to tuck under your arm !), and then just throws his tail over himself, like a spread. Not an ant can get through that cover, if it wants to.

He looks like a heap of coarse hay. I should think he'd smother himself. He's fond of the woods, and generally goes out at night for his food.

Baby Ant Bears—droll little creatures they are, too—always ride on their Mamma's back, wherever she goes.

This curious fellow lives in Brazil. Perhaps you'd like to know by what charming and graceful name the wise men call him. I can write it for you, because I found it in the wise books ; but I'd like to hear you pronounce it—*Myrmecophaga jubata* !

I guess we'll leave this name for the books, and call him simply the Ant Bear.

He's a very useful animal. But for him the white ants would clear the country of everything, I should think. They eat every imaginable substance—food, clothes, paper, and even wood. One does not know what they are about, till his chairs and tables fall to pieces, and he finds the inside all eaten out ; or on opening a book in his library, he finds every leaf eaten out, and only the covers left standing ; or his floor suddenly caves in, and drops the whole family into the cellar, when he finds every timber and board eaten hollow.

They are intolerable pests, and, of course, every one in Brazil feels very friendly to our comical bear with a bedquilt.

He lives, while at home, on ants ; but he can eat other things. One that I heard of was kept a pet, and when a few months old would eat several dozen eggs a day, besides some chopped meat.

I wonder how many ants he would have to eat to equal that amount of food.

*A BABY THAT LIVES IN A BAG.*

That is a droll place for a baby to live—in a fur bag. Baby boys and girls wouldn't like it very well, but for baby Kangaroos it is just the thing.

Most four-footed mothers, you know, make a snug nursery for their little ones, some of them under the ground, and others among rocks and other quiet places, but nature has provided Mamma Kangaroo with the snuggest place of all. It is a sort of a bag on the under side of her body.

When the baby is born it is not so large as a mouse, and of course it can't do anything but drink milk and grow. So it stays in the bag till it is eight or nine months old, and begins to want to

see the world. After that the little fellow puts his head out now and then, and sometimes takes a nibble at the grass while its mother is eating. At last it comes out and hops about a little, but for a long time, till it is able to take care of itself, it goes back into its cozy, warm nursery very often. And if the mother suspects any danger—and she's very shy, I can tell you—she just takes the little one in the bag, and away they go.

Look at the picture and see what long legs this careful mamma has, and what comical little fore legs. That is because she is made for hopping. Such hops—or rather leaps—you never saw; sometimes thirty feet at a jump. Besides the immense hind legs, she has a very large and strong tail that is as good as another leg to help to jump. She can get over the ground faster than a horse.

Her fore legs are not of much use to her when she's in a hurry, but she can walk if she likes, and a droll walk it is. She puts her fore feet on the ground, and rests on them and the stiff tail, while she jerks forward her long hind legs. So she gets on, after a fashion.

This curious animal has four toes on her hind feet, and on one of them she has a fearful nail, which she knows how to use when hunters' dogs come too near. She has also another weapon for these impudent dogs, and that is her tail. This useful member not only serves as a fifth leg, but as a club. When dogs get near enough she gives them dreadful blows with it.

The one I'm telling about is the Giant Kangaroo, and is about four feet high when sitting up. There are about fifty species known, of all sizes down to one not so big as a rat. In the Malay Islands the smaller kinds are often caught and tamed. They are extremely graceful and pretty pets.

Kangaroos are sociable fellows; sometimes a hunter will come upon a dozen of them sitting up on their hind legs, and apparently holding council together, probably discussing the weather and the state of the grass.

Unfortunately for their own comfort, they are very good to eat, and their white teeth are in great demand among the dark-skinned natives for beads, so they are frequently hunted, and have need to put the baby in the bag, and jump their best. Sometimes they are caught—in Australia—in nets. They are driven on to them, and while entangled are killed with clubs.

They have another way of dealing with hunting dogs besides

striking with their tails. If there is water near, they go in up to the shoulders, and then woe to the dog who dares to go near! The Kangaroo will seize him and hold him under water till he drowns.

Kangaroos live in the woods, and one kind, the Tree Kangaroo, even lives in the trees and eats leaves and fruit.

One little fellow, belonging to the family, is called the Jerboa Kangaroo. He is about as large as a rabbit, and very pretty. He leaps over the ground like his bigger relations, and makes a funny house for himself. Hunting up a little hollow among the grass, he builds a roof of grass and leaves which looks much like the grass around it. Most people would pass the little house twenty times a day and never see it.

When the cunning little fellow can't find grass near by that is long enough, he goes off till he finds some, and proceeds to cut down as much as he wants. He then rolls his tail around it so as to make it into a bundle—or bale, perhaps I ought to say—and hops away to his nest with the load.

When the house is done, and the babies in it, the mother is very careful to close the door, when she goes out, by drawing a wisp of grass before it. These little babies, you see, have no nice fur bag to ride in.

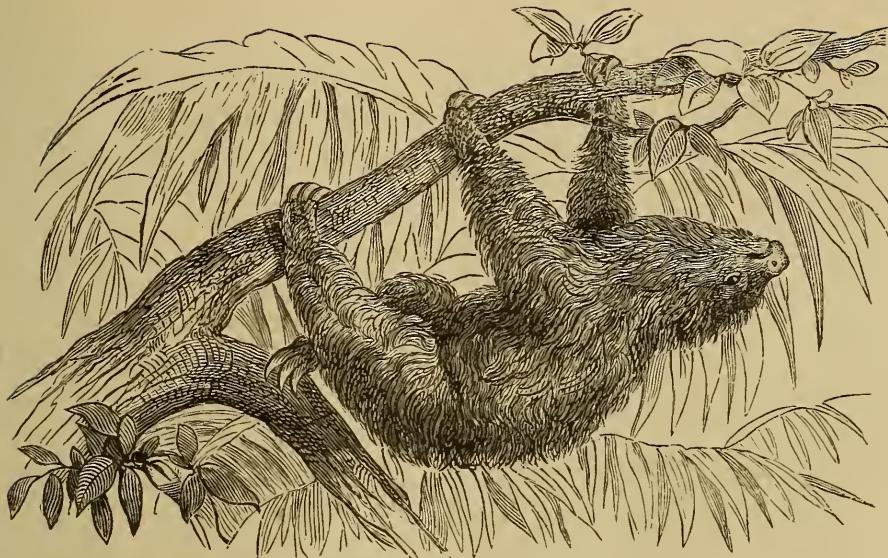
The little Kangaroo is not the only baby that lives in a bag. Here's another family just as comfortably provided for, and this happy mother has six or eight little ones to take care of at a time. It is the Opossum family, found in our Southern States. The largest Opossums are about the size of a cat, and many are smaller.

This bright looking mother has no long hind legs to leap away from her enemies, but she has what serves her just as well,—strong arms and claws to climb with, and a tail that can hold on as well as a hand. She spends the days at home, nicely hid away in a hollow tree or other snug home, and at night she comes out for food. Then the little four footed fellows, like rabbits and squirrels, may look out, for she's extremely fond of fresh meat, and has fifty sharp teeth of her own, besides a nursery full of hungry babies to feed. She will eat birds, eggs, insects, or even fruit. But her favorite morsel is a fat chicken, and here—alas!—she interferes with man's comfort and makes an enemy of him. In consequence, Opossum hunting is a favorite amusement among Southern negroes, and traps and snares await her in every farm yard.

When caught, her best means of defense is a trick, which has become famous in the world by the name of "playing 'possum." This trick is merely pretending to be dead. She will lie perfectly motionless and take any amount of beating and worrying by dogs. But so far from being dead, or even stupid, the poor little creature was never more wide awake, and the instant her tormentors turn their backs she is up and off. There are about twenty kinds of Opossums known, mostly found in South America.



One of the smaller ones, called *Merians Opossum*, has no fur bag for her babies, so when the little creatures are born, she puts them on her back, where they hold on to her fur with their claws, and curl their little tails around hers, to steady themselves; droll enough they look, I can tell you. This little mother is about the size of a small rat, and lives in Surinam.



### *THE LAZIEST FELLOW IN THE WORLD.*

Don't you think he is? Look at him; that's the way he hangs from morning till night, only opening his eyes to eat, and see what disturbs him, when he is poked up. At least that is the way he acts in the day time; he may be livelier at night. He goes on to a tree, generally the Trumpet tree, and never leaves it while there is one leaf left to eat.

You would think he would get dizzy with his head hanging down, but he was made to live that way, and I suppose he would be as uncomfortable with his head up, as you would be with yours down.

In fact he never comes to the ground if he can help it, and if he is put there, he makes a most awkward figure. His legs are to hang by, and not to walk, and he is so slow and clumsy on foot that he gets his name from that fact, and is called the Sloth.

One reason for his awkwardness is that his fore legs are so much longer than the hind ones, that when he tries to walk, he is obliged

to creep on his fore knees ; and then his toes, of which he has three on each foot, are furnished with claws, which are splendid to stick into the bark and hang on by, but uncomfortable to walk on. More than this, the toes are joined by skin to their very tips, and the foot can't be put flat down ; only the innerside of it touches the ground. So you can see he was not made to walk with head up, like other creatures, but to hang from the limbs of trees, like the one in the picture.

He is not awkward on the tree. When he is seriously disturbed he can run, (if you can call it running) as fast as any body.

He is a strange fellow in other respects. He has no tail—for one thing—and no ears, at least none that can be seen. And he has no front teeth, indeed scarcely any teeth at all.

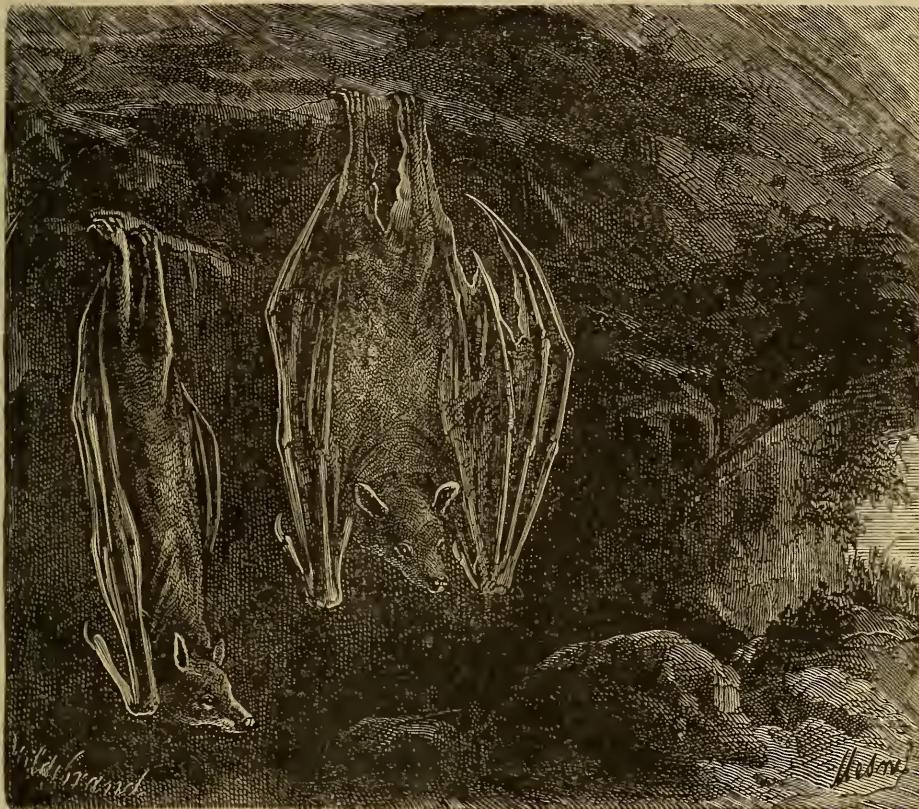
It seems to us that when he goes to sleep he must forget to hold on, and fall to the ground. But such an accident never happens to him. He can bend the last joint of his toes in such a way as to make a strong hook of each claw, and when these are stuck firmly into the wood, he hangs as safely as possible, on twelve hooks, you see.

When he wants to eat, he either pulls himself along to his food, or hangs on by three legs, while the fourth pulls the food to him.

He is a little larger than a large cat, and lives in warm countries, especially South America. He is dressed in a coarse, shaggy, long hair, which looks like dried grass and perfectly protects him from insects.

Mamma Sloth is never troubled with a large family to take care of. She has but one baby at a time, and carries it about with her till it is big enough to hang on for itself.

Hanging on is the main business of life—to a Sloth.



### *HANGING BY THE HEELS.*

Hanging by the heels from a crack in the wall doesn't seem to us a very delightful position, but there is a curious little fellow who prefers it to any other.

He generally selects some deserted ruin, old dusty church-spire, damp cave, or some such quiet spot for a home, and, fixing the long claws of his hind feet in some crack or slight projection, he hangs there all day. After the vulgar light of the sun is gone, and it gets to be twilight, he comes out to get something to eat.

This droll fellow we call a Bat, though the big books give him the name of *Cheiroptera*. And there are other curious things about him besides his way of hanging by the heels.

To begin with, he has very odd wings. They are not of feathers, like a bird's, but are made of skin and shaped like a hand; just as if your fingers were as long as your whole arm, and over the fingers and arm and fastened to the side of the body was stretched skin, just like that on your body. Then the thumb belonging to this wing-hand sticks straight up, with a very useful nail on it.

This singular fellow has a wonderful delicacy of touch. Even if he is blind, he flies around without hitting anything, because he can feel the things before he gets quite to them.

Another funny thing is the way Mamma Bat carries her baby. At first she holds it in her arms, like any mamma, wrapping it up in her curious wings, but when it is a few days old the comical baby learns to hang by its heels, and then she flies about after food, with the baby hanging to her fur.

Their common food is insects, such as flies and other winged creatures, and they catch them flying.

One of the family, who is called the Flying Fox, however, eats fruit; and in Siam there are so many of them that fruit-trees are protected by making a sort of bamboo cage over them.

Another Bat of the West Indies eats green peas, cutting a hole in the pod over each pea and taking it out.

The Vampire Bat, who lives in South America, when insects are scarce, has a fancy for fresh blood, which he collects for himself by biting a hole in the skin of some animal, and drawing the blood till he is satisfied.

When cold weather comes on, and the insects are all dead or hidden away in snug houses, to wait for spring, the Bat takes up his winter-quarters in some quiet place, hangs himself up by the heels, and sleeps till spring.

There are several kinds of Bats—some no larger than a honey-bee, and others as large as a hen, with wings four or five feet across.

They refuse to live as prisoners; no one has been able to keep them more than a few days. One naturalist, who tried to keep them alive, so as to watch their habits, tells an amusing story about their eating. He found that they liked raw meat, so he hung a piece up in the cage. When they were hungry, they

would eat it; but they had much fun catching the flies that came to taste the meat. The moment a foolish blue-bottle showed his head in the cage, a Bat would pounce on him and swallow him whole.

There have been many foolish superstitions about this innocent little animal. His ways are so odd and mysterious that the ancients, who thought everything they couldn't understand must be unnatural, had all sorts of ill omens associated with him.

But, in spite of superstition and prejudice, there are some good things about the Bat. For one thing, it is very neat, keeping its fur clean and expending a great deal of time in the operation.

Then it makes itself useful in eating so many thousands of insects. Sixty or seventy as large as a fly are not more than enough for a meal.

In Siam and Madagascar, Bats are eaten, and said to be very nice, tasting like young chicken or rabbit. In those countries they are found as large as hens, and even larger.

*DROLL LITTLE COATS OF MAIL.*

You've read of Knights in old times who wore suits of mail, but did you ever see these droll little animals whom nature has dressed in similar coats? They look like awkward and heavy cloaks, but the little wearers are far from being awkward. They are extremely lively, and run as fast as a man. They are called Armadillos.



The odd suit of mail is made of a bony substance, in small pieces, lapping over each other like the scales on a fish.

They are so hard that a bullet will not go through them; at the same time they move so freely that the little creature can get around as easily as though his coat was of fur.

Every animal—you know—has some way to protect himself, but the Armadillo has two ways; one is to dig a hole and escape in

the ground, and so fast will he do this, with those enormous claws of his, that it is nearly impossible for men to catch him. If he has not time to do this he can roll himself into a ball, in such a snug way as to leave no part of his body unprotected by the mail. In this position he can be rolled about, but no animal can get inside of the wonderful shield.

For a house to live in, and bring up the little stiff backed babies, the Armadillo digs a nice snug nursery, with several passages leading to it. In fact, when you look at those strong legs and long claws, you can easily believe that he digs just because he likes to, as a rat gnaws for the fun of it, and to keep his teeth worn off.

Members of this family generally eat insects and other animal food, and are very useful as scavengers in disposing of dead animals. They have no front teeth, but some of them have enough others to make up ; the Great Armadillo has nearly a hundred.

It is not very common to see these animals, even in their own country, for they only come out at night, prowling around and eating all they can find in the dark. With the first streak of light they go home to sleep all day.

It is a serious business to dig one out of his home. The passages are long and winding, and as soon as he is in danger of being caught he will burrow away for dear life.

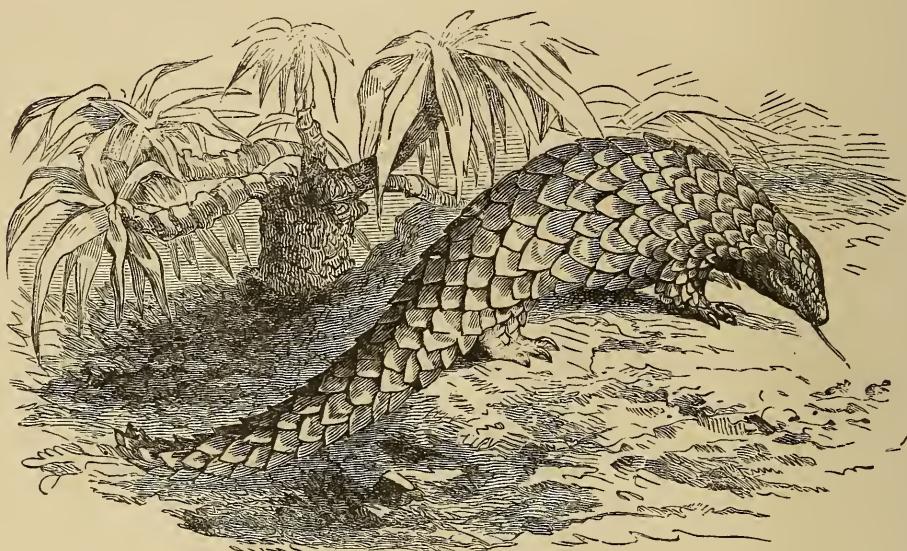
When the hunter wishes to dig one out, the first thing is to find out if he is at home. How do you suppose he goes to work? He just runs a stick into the hole, and then watches closely. If any mosquitoes come out, he knows the Armadillo is at home, and at once proceeds to dig, but if not, he gives it up at once.

I think it is the meanest thing I ever heard about mosquitoes—and I have never heard any good about them—that they not only torment the poor fellow, but are the first to give notice to the hunter when he is to be found.

In South America this odd looking fellow is eaten, roasted in his own shell. The Giant Armadillo is sometimes three feet long, and in some parts of America fossil bones have been found of an Armadillo ten feet long besides the tail.

He is not the only creature that nature has dressed in coat of mail. Here's another, even odder than the Armadillo. He is called the Short Tailed Pengolin or Manis—sometimes also scaly Lizard. You wouldn't have thought his tail was particularly short, would you? you would if you had seen the long tailed Manis.

This interesting creature is covered with scales, which overlap each other like shingles on a roof. He has no ears, at least none that can be seen outside, and no teeth. He lives entirely on ants, which he procures by tearing open an ant hill, and running into it a long sticky tongue, which holds fast every unhappy ant it touches.



If this scaly gentleman is attacked, he scorns to run away, but rolls himself into a ball at once, when his coat of mail protects him from all enemies. To perform this curious operation, he throws himself on his back, bends his head over towards his stomach, arches up his back, and wraps his strong tail tightly around the whole. This gentleman lives in the woods of India and Africa, and his name, *Pengolin*, means to roll into a ball. For a house, he digs out a burrow seven or eight feet deep. The baby Pengolins have no scales at first, but have a skin like leather, marked however just like their mother. The whole family are gentle and easily trained, when they become affectionate pets.



### THE LITTLE HAYMAKER.

This is a droll looking fellow. Look at him; short legs with long toes and claws, fine bushy tail, upper lip split up in the middle, and no ears, to speak of.

He's a bright, sharp little fellow, and lives in the mountains, where he makes a snug little house for himself. Now you can guess what those long claws are for. When he makes his home, he first digs a passage sloping down, then turns a sharp corner and slopes the passage up. At the end of the long hall he makes his home. Nice and quiet it is, too, and here is the nursery, and here the babies live, and grow up.

When the weather gets cold, the little Marmot—did I tell you his name?—begins to prepare for winter. He don't lay in a stock of nuts and acorns like the squirrels, nor does he stow away a pile of bark, like the beaver; he just moves his family down the mountain into warmer regions, digs out a new house deeper than the other, and then—makes hay for his provision.

People who have studied these little creatures, say, that he cuts the grass with his teeth—as he has no scythe, you know—lets it dry in the sun, and then carries it into his cozy winter home. When it gets very cold, the whole family shut themselves up, stuff the door with hay, roll themselves up into balls, and—go to sleep for the winter.

I've already told you about this comfortable way of spending the cold weather. It is called *hibernation*. (See if you can remember that word.)

One would think such harmless little creatures might be allowed to live in peace, but the people who live near the Alps, where vast numbers of Marmots are found, hunt them. Their flesh is good to eat, and their gray fur coats make warm winter suits for the rough mountaineers. Then if taken alive they can easily be tamed, and even taught tricks. The poor boys who live in that country, often take trained Marmots and travel through England and France, showing their tricks for money.

It is not very easy to catch Marmots in summer, for then they're lively, and fight for their liberty as well as larger animals. Besides, with the splendid diggers they have on their toes, they can get into the ground faster than men can dig them out, and so get out of the way. But in the autumn, after they have made their winter arrangements, and begin to be stupid and sleepy, it is easy to dig out the house and capture the whole family.

These interesting little fellows are very particular where they live, and are never found away from the mountains, but they have cousins who are not unwilling to live in small hills, and are very common in the Southern States. Their name in the books, is Maryland Marmot, but you've probably heard of them by the name of Woodchucks.

Other cousins—a little more distant—are Prairie Dogs, who live in regular settlements called Prairie Dog Towns, away out on our prairies. They too dig comfortable homes under ground, and so large, and so near together are they, that horses often break through and hurt themselves, besides spoiling the poor little Prairie Dog's house.

There's a curious thing about this home. It is also the residence of the ugly rattlesnake, and the burrowing owl. Whether Madame Prairie Dog takes them as boarders was the question for some time, but on studying a little into the matter, and finding the

bones of baby Prairie Dogs in the snake's stomach, naturalists came to the conclusion that the reptile, at least, is not an invited guest, but an ugly thief, who not only forces his company on an unwilling family, but steals, and eats the babies for his breakfast.

So the poor little Prairie Dog Mamma has her troubles, you see—like other four footed Mammas all over the world.



### THE ODDEST OF ALL.

I think we may safely call this the very oddest creature that ever lived. He has a bill like a bird, fur like a beast, and he swims like a fish, and climbs like an animal.

He is so strange looking that dogs bark at him, and cats put up their backs and spit, and I'm sure no one can blame them.

He comes from Australia, and his name is either Duckbill, Water Mole, Mallangong, Tambreet, Tohunbuck, Platypus, or *Ornithorhynchus paradoxus*,—whichever you like. For my use, the English Duckbill is good enough, so I shall call him by that, if he is a full blooded Australian.

There are other curious things about him besides his bill. To begin with, there's his fur coat. In fact, you may say he wears two coats. Next to his skin is a thick woolly fur which keeps out the

water perfectly, and outside of that are long hairs, so slender where they join the skin, that they will turn equally well either way. You couldn't stroke a duckbill the wrong way, as you can your kitten—there is no wrong way. That coat keeps the dirt out, and as half his life is spent in the water, and the other half in the dirt, you see he is perfectly well suited for both.

Every way you look at him he is marvelously fitted for his work. His claws are splendid to dig with, and the webs between his toes make them paddles to swim with. The bill is broad and flat to dig about in the soft mud for his food—which is worms or grubs—but it has a leathery rim at the top, to prevent its going too far in, and to keep the dirt out of his bright eyes.

When he wants a safe home for the droll little Duckbill babies, he goes to work to prepare it in as cunning a way as though he had the wisdom of all the creatures he resembles. His front door he makes in the bank of a river or pond, above the water, but carefully hidden by weeds and plants, and his back door opens under water, quite out of the reach of boys or land animals. Thus he has always a safe passage to his home, whatever pursues him.

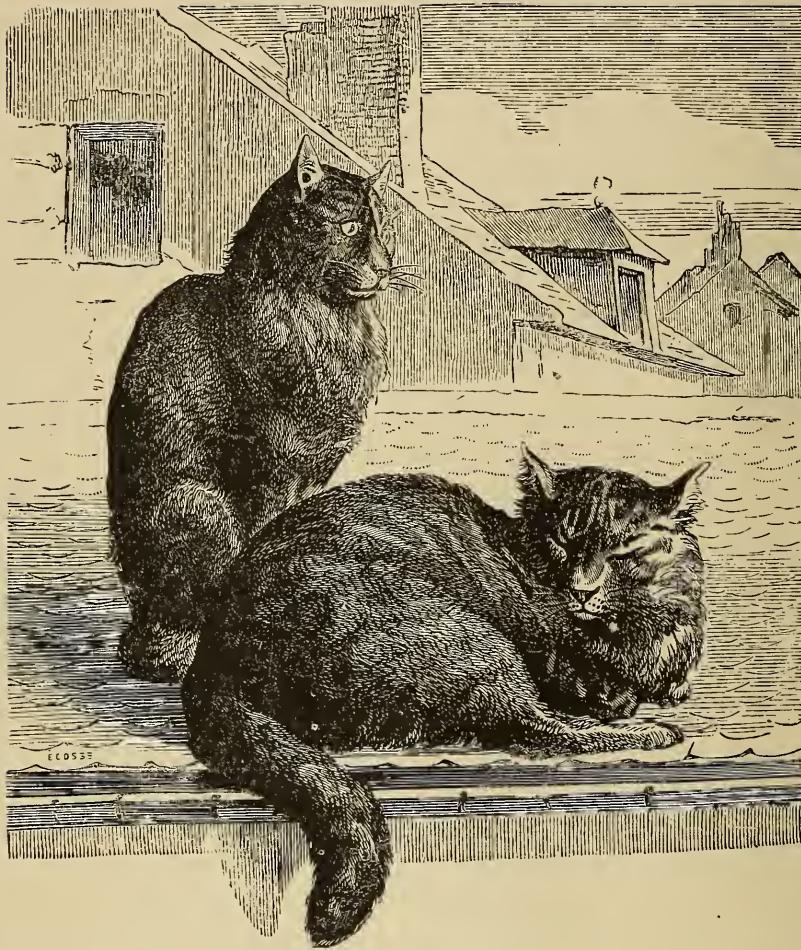
These openings lead through a long winding passage, sometimes as much as fifty feet long—though generally about thirty feet—to a snug oval shaped nursery at the end. In this room a warm dry bed of grass is made, and here the little Duckbills stay till grown. There are generally two babies at a time, sometimes more.

The Duckbill is not an easy fellow to catch, nor to hold when he is caught, for his skin fits him very loosely, and he slips through the hands as though he was oiled.

He can be tamed, and is a good climber. One, of whom Mr. Wood tells, would climb to the top of a book case, by putting his back against the wall, and walking up the book case. He is about eighteen inches long.

When swimming about in the water, he looks, if possible, more odd than when on land, for he more nearly resembles a bundle of floating weeds than anything else.

One naturalist tells a strange story of the way in which Mamma Duckbill feeds her babies. They eat only milk, and the story goes that she takes them out into the pond, and gives out her milk into the water. It rises at once to the top, and the little ones eat it from there. This is very odd, but everything about the family is odd, and it may possibly be true.

*OLD FRIENDS.*

These two little creatures, having such a comfortable time on the roof, are no strangers to any of you, but I want to say something about them, for all that. I'm moderately fond of cats now, and I remember a time when I adored the whole race.

I've heard enough abuse of poor Pussy, and I think it is high time that some one took up her defense. There's a good deal to be said in her favor, though she has her faults, like all the rest of us.

To begin with, I must tell you about a man who was as fond of cats as any little girl in America. He was even called the "Raphael of Cats," because—though he was an artist—he never painted any thing but cats and kittens. Of course, loving them so much, and painting so many, in all attitudes and of all expressions, from the innocent frolicsome kitten to the dignified head of the Cat Family, who has outgrown kittenhood as thoroughly as some people outgrow childhood, he came to paint them remarkably well. His pictures were sought for everywhere. People would hunt him up in his garret, and pay large prices for them. He was so kind to them that if a kitten went to sleep cuddled up on his shoulder, or on the back of his neck when he was leaning over his desk,—as they often did—he would sit for hours without moving, so as not to disturb them.

His favorite cat's name was Minette. In the long winter evenings he amused himself carving tiny, tiny cats out of chestnuts, and he could not make them fast enough for the people who wanted to buy.

The Egyptians revered their cats, and called them by the name of Maou. But remember what immense granaries they used to have, and how fond mice are of grain, and that nobody but Pussy can keep them all out, and it won't seem so strange. Those people had hospitals for sick kittens, and when they died they were embalmed—if you know what that is—and buried with great ceremony. If Pussy died in a private family, John was not told to sling her body into the alley; but besides the grand funeral, the family went into mourning, not by wearing black, but by shaving off their eyebrows! There is another nice thing about cat life among these same Egyptians at this very day. They have—I mean their great-great-great grandchildren have—a high officer who is called "Father of Cats," and there is a building near Cairo, where every day a feast is spread, to which are invited all the cats of the city, if they choose to come.

They *do* choose and come in crowds, and I'm sorry to say they act naughty sometimes, and quarrel over their food. It is said that Cambyses (do you know who he was?) when he went to fight the Egyptians, fastened before every soldier's breast, a live cat. Of course the Egyptians dared not run the risk of hurting the pussies—so they were conquered. It must have been a droll looking army.

In China too they are fond of cats—though it is in a stew—and they fat them as carefully as we do our turkeys.

The Japanese find cats so useful in the house, that they make imitations of them in china, so much like the genuine animal that it cheats the mice. One has only to put a little light into one of the china mousers, to scare all the mice from the pantry.

In Geneva, Switzerland, cats who have no homes run about the streets, as dogs do with us, and every body feeds them.

In Rome, and also in London, cats' meat men go through the streets with a peculiar cry, and when Pussy hears it she runs out eagerly for her dinner. The man is paid by the month, by masters and mistresses of the cats.

There are several kinds of cats. In the Isle of Man they have no tails, and in Siberia they are bright red. In Africa they are striped, and in China their ears hang down.

But Pussy has a history, you must know. The first account of her is given by an Arabian naturalist, who says that the Lion sneezed the first cat out of his nostrils. You may believe that—if you can. I wonder why he didn't say the Tiger, since the cat and the tiger are own cousins.

She has also suffered from the superstitions of men, especially when she has been so unfortunate as to wear a black coat. In the middle ages some of her race were burned at the stake for witchcraft! And as if that wasn't bad enough, she has had her head burned to ashes—you'd never guess what for—to apply to a blind man's eyes as a remedy! Whether blindness was ever cured in that way, history does not say.

An Englishwoman—Mrs. Cust—has written a doctor book for cats, to teach us how to relieve their sufferings, and the first thing to do when you want to give them medicine—she says—is to wrap the poor creature up in a cloth like a mummy, leaving only her head out. A useful precaution, I dare say, if the medicine is bad to take.

An English gardener has contrived a use for his cat, which is quite funny. He wanted to keep the birds from eating his strawberries, so he fastened Madam Puss by a short cord, to a long rope he had stretched across the bed. She could run all over the bed but not further, and she was provided with a comfortable house in an old barrel. Of course no birds came near her quarters, and there she stayed through the strawberry season.

I must say that cats have been awfully slandered. They are called cruel and treacherous, but I'm sure nothing can be more meek and patient than a respectable family cat. She will allow rude boys to tease her, too affectionate girls to squeeze the life out of her, and even baby's fat fingers to poke open her eyes, and pull her tail, and never show a claw.

I don't know why she should be called cruel because she kills birds to eat. Is it any more cruel, I want to know, for poor hungry Puss to kill a bird for her dinner, than for cook to kill a chicken for *your* dinner?

She is called suspicious. Who—I'd like to know—has better cause to be suspicious? Isn't she considered fair game to torture and kill, not only by dogs—but by bad boys?

She is called a thief. I never saw a well fed cat that was a thief; of course if she's half starved she'll help herself, and so will a dog. And how are they to know any better I'd like to know? Who ever tries to teach them not to steal, except by boxing their ears, and then maybe they don't know what it's for.

Pussy is a perfect lady in all she does—except the way of getting her dinner that I spoke of. She is nice and tidy enough for a model to careless children. Who ever saw a family cat with mud on her—like a dog, or with fur all roughed up, or with wet feet? Then she is fond of perfumes; if you don't believe it, try her with a perfumed handkerchief. I'm sure you've seen her go into ecstacies over a piece of cat mint. She also likes a soft cushion to lie on—which shows her good sense, I'm sure.

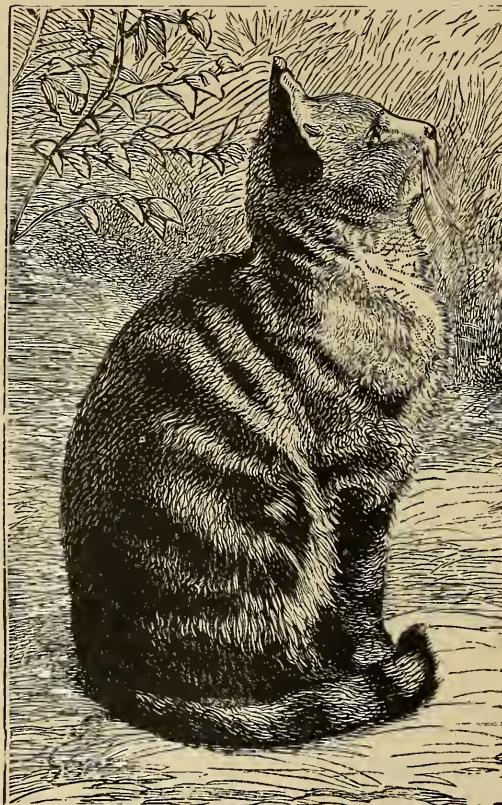
To be sure, Pussy does sing unpleasantly loud, and dreadfully dismal tunes in the night, but it's no more disagreeable than the irritating bark or dismal howl of a dog. And there's even some excuse for it, too. When else—will you tell me—can she have a nice quiet sing, except when people are safely in bed, and wagons are still? What chance would she have of a peaceful time, if she should start it in the day time?

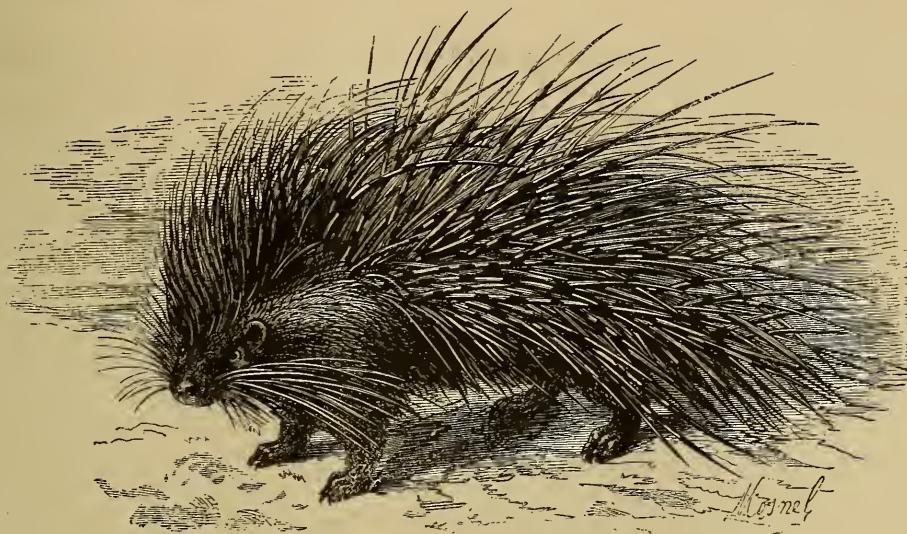
I could give you a long string of names, of great and famous men who have been very fond of Pussy. There was Mahomet who was so fond of his cat Muezza, that once when she was sleeping on his sleeve, and he wished to get up, he cut off the sleeve rather than disturb her. And Andria Doria—one of the rulers of Venice—who not only had a portrait painted of his pet cat, but when she died he had her skeleton preserved as a treasure.

Rough Dr. Johnson had his pet cat named Hodge, and used to go out himself, and buy oysters for him.

In New York there is a Cats' Doctor who says he has three thousand patients, the pets of wealthy families.

I want to tell you girls one or two pretty names for kittens. One is "Pusheen"—which is Irish for Puss, and another is "Gateta," (pronounced gah-tee-ta).





### *A WARRIOR.*

Ugh! what a bristly fellow this is! It wouldn't be very pleasant to take hold of him, with all his quills sticking out like so many needles.

I suppose I needn't tell you that this warlike personage is a Porcupine, and that he has on his fighting manner, which is a very uncomfortable one, it must be admitted. If you should get a stab from any of those sharp quills, it would be very painful, and if every speck of the quill was not taken out, it would make a long, tedious wound to cure.

These curious weapons are eight or nine inches long, and black and white. When the animal is in good humor, and sees nothing to be afraid of, the quills lie flat down, and he does not look so very fierce. But let him take fright, and they all fly up in an instant, and he is ready to defend himself. It must be convenient to have one's weapons so handy. If danger comes near, he turns his back to the enemy, and charges at it backwards, or else sticks his head between his feet and grunts. If it is night—and it

generally is when he is out—he bristles up his quills and rattles them loudly, to assure everybody that desires to attack him, that he is armed, and ready.

Fortunately he is not very large, not more than two feet long. He is not a beauty, any way you look at him. He has a clumsy head, short ears, wide mouth, an awkward walk. He is not fond of society, he doesn't look very sociable, does he? He lives in a burrow alone, and comes out nights, as I said, for his food, which consists of herbs and fruit. Baby Porcupines come into the world with the full stock of quills.

Strange as it seems, this unhappy looking fellow is good to eat, tasting something like fresh pork. He sheds his quills periodically, as birds shed their feathers. They are dangerous weapons to animals, for if one gets in where he cannot get it out, it gradually works its way in till it is completely buried in the flesh. Often it works into some vital part, and kills the animal.

The quills are also useful; first for penholders, from their lightness, and also for making ornamental boxes and baskets. Porcupine hunting is a regular sport in some countries, and among the rest in Africa, where it is hunted by the natives. When an enraged Porcupine gets among a party of hunters, it runs at them backwards, so fast and furious that the bare-legged natives have to run and jump over it, and get out of its way as best they can. Sometimes the performance is very amusing.

The common Porcupine does not live in our country, but one of his cousins of the same warlike disposition is a native, and is very useful to the Indians. They eat his flesh, use his skin for various purposes, and with his quills—which they dye in bright colors—they embroider figures on their bark works and on moccasins.

There is another animal living in Australia and called a Porcupine, though his name should be Porcupine Ant-Eater. Here is a picture of him. He has some odd ways. If he is pursued, he will settle on the ground, arch up his back, draw all four legs under him, and scratch away the ground so fast, that he sinks out of sight before your very eyes, and before you can get hold of him.

In fact, getting hold of him is not much more agreeable than of his namesake. When he is caught he has an inconvenient way of holding on. He will fasten himself to a flat board with all four of his feet, and his head curled under him in such a way that one

can't take hold of him without getting pricked, and there he will hold for hours.



One that I read of, could only be got up by slipping a spade under him. There isn't much comfort to be had with him anyway, for he will dig under anything.

So he isn't very popular as a pet.

The Porcupine is not the only animal who wears a suit of spikes, with which to defend himself. There is the Hedgehog, a little fellow not a foot long. He is not so warlike as the porcupine, his chief anxiety being to defend himself from his enemies. He has plenty of these, too, for he is a favorite morsel with foxes and dogs and cats.

His way of taking care of himself is very droll. It is merely to roll himself up like a ball. You must know that it is only on his back that he is protected with sharp spines, so on the approach of

an enemy, he throws himself on his side, and in a second is rolled into a prickly ball, which no animal can pull open. He will allow himself to be rolled over, pulled about, and even thrown down from high places and never unroll.

Pliny—a naturalist, who wrote many years ago—says that Hedgehogs will climb trees, shake down the choicest fruit, and then making themselves into balls, fall down onto it, and carry it off sticking to his quills. Now of course we can't say what those old-fashioned Hedgehogs may have done, but we can say that they don't do this curious trick now.

Hedgehogs live in the woods, in homes made of moss and such things, covered so snugly with leaves that the hardest rain can't get through. Baby Hedgehogs are pretty little creatures with white spines, and hanging ears, and they look so little like their parents, that they have sometimes been mistaken for young birds.

These little animals eat beetles, frogs, cockroaches, and anything they can find. They will drive hens off their nests, and eat the eggs, and when very hungry they will even eat Madam Hen herself. Snakes are pet morsels with them. They first kill it by biting on the neck, and then begin at the tail and devour it—as you would a radish.

There's one curious thing about them—that no poison will hurt them. They can eat the most violent poisons, and be bitten by the most venomous snakes, without effect.

They are wary little fellows, sleeping through the day, and coming out at night for food. When cold weather comes on they prepare for winter by rolling themselves up in vast quantities of moss and leaves, so that no cold can get in, and thus made into a comical ball they sleep in their nests till spring. Of course they eat nothing, and when they wake they are ferociously hungry, and start out ready to attack even a rabbit, if nothing smaller is convenient.

Hedgehogs have been tamed, and they are very useful in keeping basements clear of cockroaches, since the night is their time of being out also. I read of a tame Hedgehog, that was kept in London to kill black beetles which overran a kitchen. During the day Spot—that was his name—would lie before the fire with the cat and dog. The dog he never troubled, but the cat was his aversion. Once in a while he would suddenly bite her tail—as though in play—and then roll up, so that puss could not pay him

back. After a while, she had a family of kittens, which she was careful to put on a table out of Mr. Spot's way. But one day when she was out, he managed to climb up by the table leg, and he at once pushed one of the kittens off, then rolled off himself—for Hedgehogs can roll from great heights without hurt—and snatching the kitten, was dragging it off to his hole, when Madam Puss came back. She flew at him, but only got her nose full of prickers. He would not give up the kitten, and Puss fought like any other mother, to save her baby. At last the owner of both had to interfere and take the little creature away.

That settled the matter of even a show of friendship, for never again did cat and Hedgehog lie together on the hearth.

Hedgehogs are useful as food, cooked in various ways. Gypsies and other wanderers in Europe have a curious way. The animal is rolled up in a thick layer of clay. The whole bundle is then put on the fire and baked till the clay is hard and cracks. It is then taken off, and broken open, when the skin comes off with the clay and Mr. Hedgehog is ready for the table—or the fingers, more likely, I'm afraid.

The most curious use to which Hedgehogs are put, is in medicine—or was long ago. One wise and grave writer gives directions for making a wonderful eye salve, that would enable a person to see as well by night as by day. It was made by taking the right eye of a Hedgehog, frying it in oil, and keeping in a brass vessel for a long time. The fried eye imparts its virtues to the oil, and to this day country people in England think his fat is good for deafness.



### STORY OF A WILD BABY.

This is an interesting looking fellow creature—isn't it, now? Shall I introduce it?

My dear young friends, this is Orang-Utan, or otherwise, *Simia Saiyrus*, familiarly called Mias, and it is said—by some scientific gentlemen—to be the most like human beings of any of the animal creation.

The original of the picture was taken in Borneo, by an English naturalist, and was three feet high, and about six and a half feet from one hand to the other. Its skin and bones, at present, occupy a place of honor in a British Museum.

So much for its biography. I want to tell you the story of a comical Mias baby, which Mr. Wallace saved alive when he sacrificed its mamma in the interests of science. The infant was about a foot long, without a tooth, but with lungs of wonderful power, which it made use of to cry—like its cousins of the human race.

Like those helpless little creatures, it had great fondness for being held and petted, and would cry and fret when put down. But the gentleman had other business besides tending baby Orang-Utans, so he fixed up a box with a soft mat for the little creature, and there it had to lie, whether or no.

The greatest trouble was about food. Milk is an unknown article among the natives of that Island, and rice water and cocoanut milk and such things as the foster parent could procure, did not satisfy the unhappy baby. It cried and screamed and made a great fuss generally, till it got sweet potatoes, and soaked biscuit with plenty of sugar. It had to have a daily bath too, as well as human babies, and after the first few times bathing it grew so fond of it, that it would cry and scream to have the cold water thrown on. There's an example for some of you.

But the great need of the poor orphan was a mamma. It was cold, and it wanted something to get hold of. The anxious nurse, in the kindness of his heart, thought he would get up a sham mamma. So he took a buffalo skin with the hair on, made it into a roll, and hung it over the restless baby. This seemed to suit very well; the little creature would sprawl around and grab the furry humbug. But after a while it got the hair into its throat, and nearly choked to death, and the buffalo skin mamma had to be taken away.

But a new comfort appeared, for the same gentleman caught a young monkey, and introduced it to the Mias baby as a play-fellow. This pleased it very much, it made no fuss when the lively little monkey sat on it, and even laid down on its stomach to sleep. In fact, the baby seemed to like it, and took its revenge by hugging the droll little monkey.

Though it cut four teeth and lived some months, began to learn to walk, and otherwise make itself more interesting, it never grew a bit, and at last it became sick and died. Mr. Wallace felt very badly, and took its skeleton home to England.

The Orang-Utan lives in the trees of Borneo, and eats fruit. They have long shaggy red hair, and one of large size has a body as large as a man's; though it is never more than four feet high.

They never come to the ground if they can help it. They make their beds in the trees by breaking off branches and laying them across the limbs. The natives say that when it rains they cover themselves with other branches and leaves, and make what

looks like a little hut up in the tree. They run along the limbs, and swing themselves from one tree to another. The trees are so near together in their native forests, that they can easily do it.

They have no feet—as you see in the picture—but four hands, and they have such a grip that when they are dead the grasp is not loosened for some time. When the mother is out with her baby and is attacked, she defends herself by throwing branches and fruit at her tormentor, but Papa Orang scorns such an undignified proceeding. He doesn't hesitate to fly at a man, and bury his teeth in his flesh. So the natives of the country are afraid of him.

They usually find all the water they need to drink in the hollows of the leaves, but when there are no fruits and they go down to the water for tender young shoots to eat, and water to drink, a self sufficient crocodile will sometimes venture to attack one. He generally gets the worst of it, however, for the Orang jumps on his back, pulls open his jaws and kills him. The animals of the forest know him better, and never touch him.

This charming family is found only in Borneo and Sumatra, and I don't believe the rest of the world feel very badly about it.

Whole books have been written about monkeys, and of course I can't tell you half the strange and wonderful things about them. You have read about the droll way they have of crossing rivers, by making a bridge of themselves, and though some people deny that it is true, others of the best and most reliable authorities insist that it is a fact; so I think we may venture to believe it.

There are many different kinds of animals, from the monster Gorilla to the pretty little Marmoset, that are vulgarly called monkeys, but they are brought—in the big books—under one name, *Quadrumana*, which means four handed.

Here is a picture of another variety of this family. Pretty looking fellows, aren't they? The little one seems to be taking a lecture of some sort, but I don't think he cares much about it. These monkeys—Long-nosed Monkeys, they are called—look so much like human beings, that the natives of the Malay Islands say they are men who have run into the woods to avoid paying taxes.

Mr. Wallace says they are about the size of a three years old child, and the nose is longer than any man's nose. They live in the trees, and are very wild.

The Islanders also say that when jumping about among the



branches these creatures take their nose in one hand, to prevent its being hurt by the branches.

They are a very pretty color, a bright chestnut red, relieved by golden yellow.

Here is another of the family, rather more interesting than the long-nosed gentry. It is the Marmoset, and is found in South America. It is not much larger than a squirrel, and is quite as graceful and cunning in its ways. It lives on insects and fruits, and spends its time in the branches of trees. It is social in its ways, being always found in small troops in the woods.



It makes a very pretty pet, living contentedly in a cage, and having plenty of soft silk fur. This family is among the most intelligent of its kind. It is said even to recognize pictures. A gentleman who experimented with some of them found they would shrink away from pictures of cats, or of wasps, as they would from live cats and wasps, but when shown the picture of a grasshopper, or other harmless insect, they would snatch at it.

This little fellow in the picture—the common Marmoset—is ornamented with a tuft of white hair on each side of his head. Others of the family have black tufts, and still others have a sort of plume over the forehead.

In the London Zoological Gardens, are kept nearly two hundred monkeys, and it is a very interesting sight to see them dine. Their dinner is cooked and served at four o'clock. They have a variety of things to eat—boiled potatoes and carrots, baked apples, nuts, and grapes, pies and puddings, oranges and fruit. This food is cut up, dishes are used and one old baboon helps himself with a spoon, though it must be admitted that most of them show a firm belief in the old saying, "fingers were made before forks."

In the countries where monkeys are common, they are used for food, and a common green monkey baked in a pie, is said by travelers to be very nice eating.

I must tell you one more story before I leave the monkeys, about one which was tamed by a traveler in South America. He was exceedingly fond of his master, and his favorite seat was on his shoulder, when he would wind his convenient long tail about the gentleman's neck—to hold on. The weather being warm, this sort of a necktie was rather uncomfortable, but the poor little monkey felt so disappointed and unhappy when his master refused to carry him on his shoulder, that he had not the heart to insist, and so Mr. Monkey kept his place.

When he had nothing else to amuse him, he would entertain himself by twitching out two or three hairs from his master's head or filling his ears with leaves and other rubbish, and if the boat tipped any, he would hold on by his ear or hair. All of which was very nice for the monkey, but rather uncomfortable for his master. One reason they were so attached to each other, was probably the similarity of their pursuits ; they were both indefatigable insect hunters. The master hunted them for scientific purposes, but the monkey simply to eat.

There is a curious fact told about monkeys which are kept in captivity ; they have the strangest fondness for *eating their own tails!* If any body of less authority than Rev. J. G. Wood had told us of this, we would feel like laughing at it, but he says it is true, that long-tailed monkeys of the old world will commence at the tip, and nibble away in spite of anything the keeper can do, till the tail is eaten up.



### *A LONG TONGUE.*

Wouldn't you think yours was a long tongue, if it was as long as your whole body? Well, odd as it seems, there is a little fellow who lives in Africa, with just such a tongue, and you can't imagine how useful it is to him.

You see he is a dignified, slow-moving little creature, and he lives on insects and such lively game. He could never catch them, and might starve to death, only that he can dart out his tongue, as quick as a flash, and as long as his body. The end of this droll weapon is sticky, and holds fast any unfortunate insect that it touches.

The little animal I speak of, is a Chameleon, and his tongue isn't the only droll thing about him. His eyes are very curious. To begin with, they are very large and round, and stick out like big beads on the side of his head. And the funniest thing is, that he can turn them different ways so as to see all around him. He can turn one up and the other down, or he can turn one forward and the other back, and thus see everywhere. It must be a very small fly which can escape these sharp eyes.

And that isn't all about them. These eyes are covered with

eyelids all the time. To be sure, there is a hole in the middle, where the bright eye looks out, and he can contract or expand it, as he likes, but he can't uncover his eyes as we can.

But his tongue and his eyes are not the only odd things about him,—his feet are droll as the rest. He has five toes, just as you have, though they are more like a bird's claws than like your toes. They are all long and have claws on the ends, and then they are fastened together by skin in a curious way. Three of them are fastened into one sort of bundle, and the other two into another.

You can see how nicely this arrangement enables him to hold on to the branches of trees, where he lives. All four of his feet are fixed in the same way. And, as if four such hands and feet were not enough, his long slim tail is as good as another foot. He can curl it around a branch as a monkey can his, and hold on with it. Even when he walks on the ground—which he don't much like to do—he steadies himself with this useful tail.

Everything about this fellow is odd. His skin is not fastened tight to him, as it is to most animals. It is more like a loose bag, and he can swell it out into queer shapes, or rather into a shapeless mass, by filling it with air. And another oddity about this skin is, that by a peculiar arrangement of the coloring matter, he sometimes appears to be one color, and sometimes another, according to the way the light strikes him. It is something like what you have seen in changeable silks.

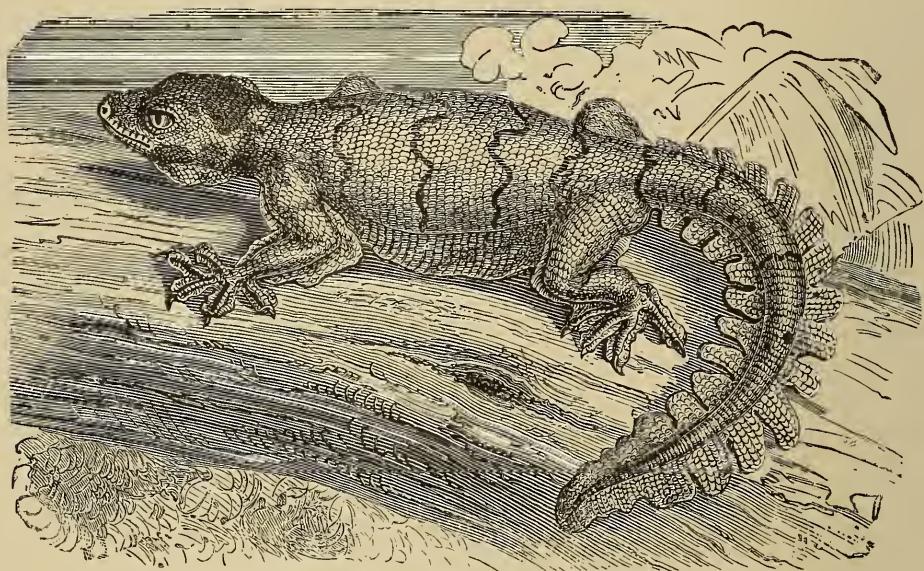
Funnier still, he can make one side one color, and the other side another color. In fact his two sides hardly ever do agree. One side will be asleep while the other is awake, and on account of this one-sidedness, he cannot swim as most animals can. When he is angry, he puffs himself up as big as he can and makes a hissing noise.

Strange stories are told about this curious little fellow, in old times. It was really believed that he had no regular color of his own, but that he took the color of the thing he was near, being green among the leaves and brown on the ground. That error was caused, of course, by the changes of color I spoke of.

Another error was the effect of his curious habit of blowing himself up like a bladder. It was said that he had no particular shape, and that he fed on air. In fact, he had no character of his own anyway—neither color nor shape!

The wisest men of old times believed these stories, and it seems droll enough to read of it in serious, wise books. Even the name of the honest little fellow got to mean one who changes his opinions to suit everybody and has no fixed ideas of his own.

You see it has taken hundreds of years, and hundreds of men watching them, to find out about these curious little fellows ; and you can learn it all in five minutes.



He has some cousins that I want to tell you about. Here's one—lovely creature he is too, isn't he?—with his broad flat head like a snake, and his tail trimmed with scollops in the very latest style. Look at his feet, with their cat-like claws, and his soft trailing body that always drags on the ground. These claws enable him to climb anything, the smoothest wall or rock, and hang on for hours without moving.

When he does move, it is with a sudden rush, with no noise, and generally in the night. Altogether, there is something so uncanny in his ways that he has got a very bad name with the people of the warm countries where he lives. They say that he is very savage, and his bite is poisonous. But the experiments of late years have proved him to be a harmless fellow enough, who only asks to be let alone, to live on old walls or rocks, and catch the insects and spiders he wants to eat.

His name is Gecko, and he gets it from a singular noise which he makes. It is as near like the noise you make to a horse, to start him off, as anything, and it isn't a spellable word.

This picture is the Wall Gecko and is supposed to be a descendant of those who lived ages ago in Greece and caught spiders on the walls in the days of Aristotle.

(See if you can find out who he was, and what he did in the world that his name should be remembered so long.)

The Wall Gecko is of a gray color, so near the color of the ground that when lying in wait for his food, he can scarcely be seen.

This is not the only relative of our pretty little fellow with a long tongue. In fact, he has plenty of relatives, for he belongs to the family of *Saurians*, which includes Lizards, Crocodiles, Alligators, and I don't know what all. But I'll only show you one more of the family—the Iguana.



Speaking of beauty, I don't think this fellow has much to boast of; to tell the truth, I'm perfectly willing he should live in Brazil.

He is gentle and harmless, and his flesh is very nice in a stew or a roast. He has a sort of crest, running from his head to the end of his tail, and he is covered with small scales.

But the oddest thing about him, is the bag or pouch which hangs from his chin. Some travelers say that when he is angry or excited, that pouch puffs out quite large—but others deny it—and when naturalists themselves disagree, stay-at-homes—like you and me—can't expect to know which is the truth.

Some Iguanas live in trees, but come down to the sea shore to deposit their eggs in the warm sand. These eggs are not hard like a hen's, but soft like leather, and of a light yellow color, about the size of a pigeon's egg. When the baby Iguana comes out of the shell, it is about four inches long.

The most useful thing an Iguana has, is his tail. It is more than twice as long as his body, and an extremely handy organ. When hunted by dogs, as he is in his native country, nothing could be better to slap and inflict severe wounds on his enemies, than that sharply notched tail. If that is not enough, however, he has recourse to his claws and teeth, and can scratch and bite savagely.

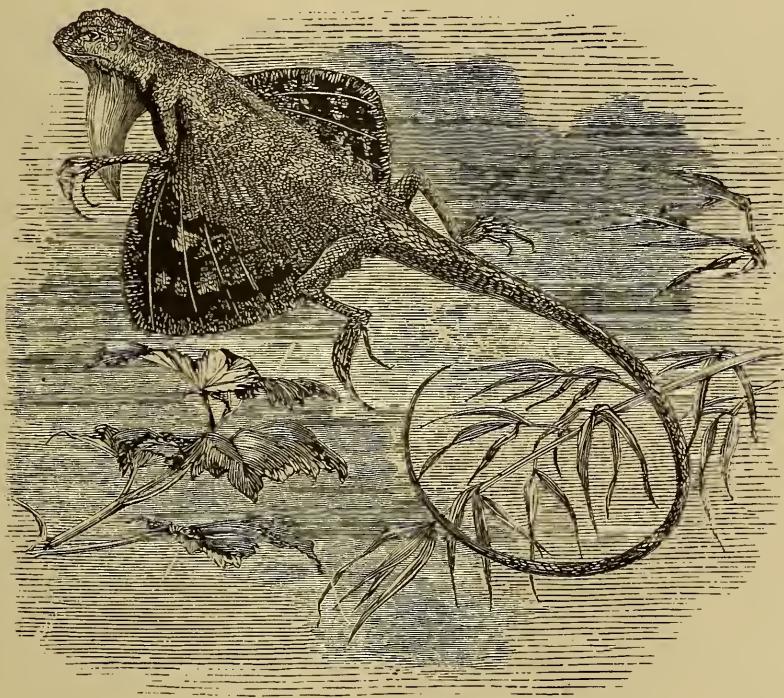
In swimming, the tail is no less useful, for he draws his legs close to his body, and uses only the tail, moving it like a snake through the water. He is a vegetable eater.

Some of the Iguanas, for there are several varieties, live on the sea shore, and are fond of swimming out into the sea, and diving to the bottom for their food, which consists of weeds that grow there.

Still another kind, that Mr. Darwin found in one of the Galapagos Islands, digs for itself a home in the ground. He does his digging in as odd a way as he does everything else. He works only one side at a time, one fore foot scratches up the dirt, and throws it back when the hind foot pushes it out of the hole. When that side of his body is tired, the creature goes to digging with the other side.

The same gentleman tells how they raise themselves up on their fore legs, like the one in the picture, nodding their heads and trying to look very fierce; but if a person stamps his foot at them, down goes the tail, and off scrambles Mr. Iguana to his hole.

Iguanas are hunted with dogs, and in some places, when caught, their mouths are sewed up to prevent their biting, and they are brought to market alive. This is horrible, but I am afraid true. The Singhalese use its feet to cure skin diseases, and its tongue taken from a living Iguana and *swallowed whole*, is said to be a certain cure for consumption! I think the remedy is worse than the disease.



*MY LITTLE NEIGHBOR IN GREEN.*

I have a curious little neighbor who always wears a green coat, and has some droll ways.

The coat is not plain green, either; it is relieved by wavy black stripes, and gorgeously trimmed with three bands of gold-color down the back. Then he has a most dainty vest of gray, green pantaloons (very tight), and a pair of gold spectacles.

He is a very dignified person, and his gold "specs" make him look as wise as an owl.

I said he was my neighbor, and he is, for he lives in a pond not far off. I suppose if you should see him sitting there on the bank, some morning, you would call him a Frog, but that isn't his "Sunday-go-to-meeting," scientific name. You don't suppose the wise men who give such hard names to all the innocent little creatures in the world (names that are always printed in italics, and you "skip") have neglected our little green friend, do you?

By no means! He belongs to the *Batrachian* family. I wonder how he'd like it—if he knew it.

A droll thing about this little fellow is, that when he was a baby he wasn't a little frog, but a little fish. He had a tail and gills, and swam around in the water like other fish. He was called a tadpole, and ate vegetable matter.

As he grew, a wonderful change came over him. In the first place, his gills withered away. After a while a pair of legs burst out of his skin. They grew quite long, and then another pair burst out in front of the first ones, and he became the possessor of a tongue. The next thing that happened was, his long tail shrank away, his lungs developed, and at last he hopped out of the water a perfect frog—*batrachian*, I mean.

If you think this too strange to be true, you can see the whole thing for yourself. Any time in the spring, go to the nearest frog-pond, where you will find plenty of the eggs floating on the surface. Gather a few, and put them in water. If you have an aquarium, put them in that, or in a globe with gold-fish, or even in a common dish. Then keep close watch of them, and you'll see all these wonders.

I need not tell you anything about the voice of this little neighbor in green, for I am sure you've often heard it, in the



twilight, when everything else is still. It must be admitted it is rather a harsh voice, and in old times, when the finest palaces were surrounded with frog-ponds, servants were kept stirring the water by the hour, to prevent the poor little fellows from singing.

During the summer my little neighbor is a great eater, devouring a host of insects, worms, and such things. And so anxious is he to have them perfectly fresh, that he catches them alive and eats them at once. But in the fall he becomes melancholy and leaves off his food. And when the weather gets too cool for his light coat—he has no fur or feather overcoat, you know—he buries himself snugly in the mud at the bottom of his native pond, and goes to sleep for the winter.

A pretty good nap, I should think.

He is often frozen, but he doesn't much care for that. The first warm weather of spring brings him out, lively and bright as ever.

This little fellow is the "edible" frog. That means he is eatable; and very nice he is to eat, too. You would never laugh at any one else after you had once eaten the delicate white meat that grows under his green skin. It tastes like tender young chicken, and I am sure I don't see why a frog isn't as pleasant to eat as a horrid-looking lobster.

The edible frog has a cousin—the Green Tree Frog. This dainty little fellow is quite small, and lives on trees. His coat is green, too, but it is a lighter color. If he is not so dignified as his cousin, he is much more graceful.

Under his toes he has tiny suckers which enable him to hold on to the tree, no matter how smooth it may be, and even on to the under side of a leaf. To match his light coat, his vest is white, and he, too, spends his winters in a snug mud-bed at the bottom of a pond.

But there's still another of the family—though he's a foreigner and lives in Borneo. He is a large tree frog, and can fly, at least after a fashion. He has no wings, but very long toes with skin between them, like a duck's. When he spreads them he can take a flying sort of a leap, and come safely to the ground. He is four inches long.

The Amazon is the paradise of frogs. They are found there of all sizes, from the tiny atom of a frog that crawls up on a blade of grass, and sits there an inch above the water and chirps, up to the monster a foot in diameter, which I'm sure I never could call my *little* neighbor.

Men are not the only creatures who like to eat frogs. Among their worst enemies are the snakes, and the cunning little fellows have a droll way of getting out of a snake's clutches. When seized by one of this family, the frog at once swells himself out as big as he can, and if the snake is not one of the monsters, he can't swallow such a big frog, and so lets him go.

You know the noise that frogs make in our country. I'll tell you what a naturalist (who has been there) says they say on the Amazon.

"Quack, quack; drum, drum; hoo, hoo," and very pleasant it is to hear—he says.

There is a very curious story told of a frog found in France and Switzerland. After Mamma Frog has laid the eggs, she goes away and takes no further notice of them. Then the virtues of

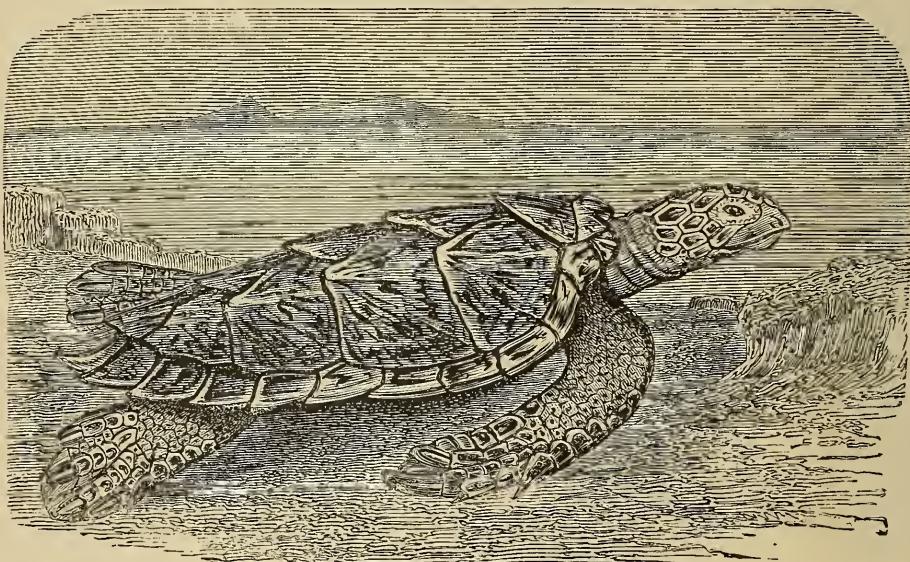
Papa Frog shine out. He carefully takes each egg and sticks it to his own hind legs. When he has fifty or sixty thus disposed of, he hunts up a quiet retreat—some deep hole, generally—and there he stays with his young family, till they are ready to hatch out, when he takes to the water with them. This most excellent Papa is called the Nurse Frog.

Frogs have also been used in medicine. Some of the old writers gravely tell that frogs boiled in vinegar are good for toothache.

*A FELLOW WHO WEARS HIS RIBS OUTSIDE.*

It isn't because he is nothing but bones, either. He has plenty of flesh, and you have seen some of his relations dozens of times, I have no doubt. Only you didn't know that the snug house he lives in is made of the usual bones ; the ribs made broad and strongly united together to form a roof, and the breast bones widened to make his floor.

He lives in a regular fort, where he can draw in his head and feet, and bid defiance to most of his enemies. And more than that—he never leaves his fort for a moment, but carries it everywhere he goes. All he has to do is to raise his roof a little, stick out four stout feet and a head, and he can walk off as well as anybody. Then, if surprised by an enemy, he jerks in his head and feet, snaps down his roof, and then he is snugly hidden by his shell house.



This curious fellow is a Tortoise, or turtle, and of course you boys have seen many of his small relations, that you call mud turtles. But I want to tell you about the big ones, the

Sea Turtles, that sometimes weigh many hundreds of pounds, and have shells five or six feet long. These big fellows stay in the water; they swim and dive, and remain under water a long time. In fact, they scarcely ever come on shore, except to lay their eggs.

You must know that turtles' eggs are very nice to eat, and not only men are fond of them, but fishes, and all sorts of sea monsters devour them, and it wouldn't be very safe for Mamma Turtle to display any eggs there, so she swims to some quiet place where there is a broad sandy shore. Sometimes she travels hundreds of miles to such a place, for it is said she will go nowhere except to the place where she was hatched herself. Then, in the night, when she thinks all men and other land monsters are asleep, she walks up on the shore, and digs a hole with her feet, nearly a yard deep.

In this hole she lays the eggs, sometimes more than a hundred of them, and then carefully covers them up with sand. Funny way to raise babies—to bury them—isn't it? But they don't stay buried very long; the heat of the sand hatches them out in fifteen or twenty days. Odd little things they are, white and about the size of a frog. They know something, however, for they rush directly off to the sea, and those who don't get eaten by big fish grow up.

Turtles have no right to complain about having their babies eaten, for they eat babies themselves,—crabs, and such little fellows. I don't suppose they care much about it anyway, for they don't stay to protect them.

They have a curious way of floating on the surface of the water, perfectly still, apparently asleep. Then if men are careful to make no noise, they can catch them by slipping a noose over their head.

The Sea Turtle is very useful to men. In the first place, his flesh is good to eat. Turtle soup is so nice that they are carried to distant lands very carefully, alive. Then the eggs are eagerly sought for, both to eat and to make into oil. Some of the natives of the countries where they are common, use the big shells for boats, and to bathe their babies, and for roofs to their huts. The shells of several kinds are useful in still another way. They are made into various fancy things, such as jewelry, boxes, combs, etc., and very pretty they are, too. The Hawk's Bill Turtle in the picture has the most valuable shell for this purpose.

To prepare it for use it is softened by boiling, and made flat in a press, when it is ready to cut and polish.



There are other ways to catch turtles, besides surprising them asleep. One way is to keep watch when they come on shore, and then turn them over. They are so clumsy they cannot turn back, and they can be left till the next day, and then carried off.

Sometimes they are killed with a harpoon, in the same way as a whale, and sometimes they are secured in another way. The natives—seeing one floating—come quietly up, as near as possible in a boat, and then one of them jumps on his back. Of course he dashes off, but the man holds on, and rides till he is tired out and easily captured.

These valuable creatures belong to the Reptile family. They are cold blooded and pass the winter in a state of torpor.

On the Amazon, people have turtle ponds to preserve a stock of food for the wet season, as we have store-rooms and cellars to keep our provisions. Every bit of the creature is used. Steaks are cut from its breast, sausages are made from its stomach, soup from its entrails, and the rest of it is roasted in its own shell.

Turtles are so important to the people in those countries that the government takes charge of the business of egg gathering. The river turtles make a business of laying their eggs, coming down from the ponds above in crowds, to where there are sand islands, just suited to the hatching out of the little ones.

Sentinels are placed to watch for the arrival of the anxious mothers and to see just where they put the eggs. The turtles come up in the night, dig deep holes in the sand, lay their eggs—more than a hundred at a time—cover them up nicely again, and waddle off to the water. This business occupies about two weeks, when they all tramp off to their homes further up the stream.

When the time comes for gathering the eggs, everybody is invited to join the party, and hundreds of people go, armed with big kettles and earthen jars, to prepare and hold the oil which they get from the eggs.

They build rude sheds of poles covered with palm leaves, to keep off sun and rain.

In the same country the natives—when suffering from thirst—kill a land tortoise and drink the water which they find in his reservoir.

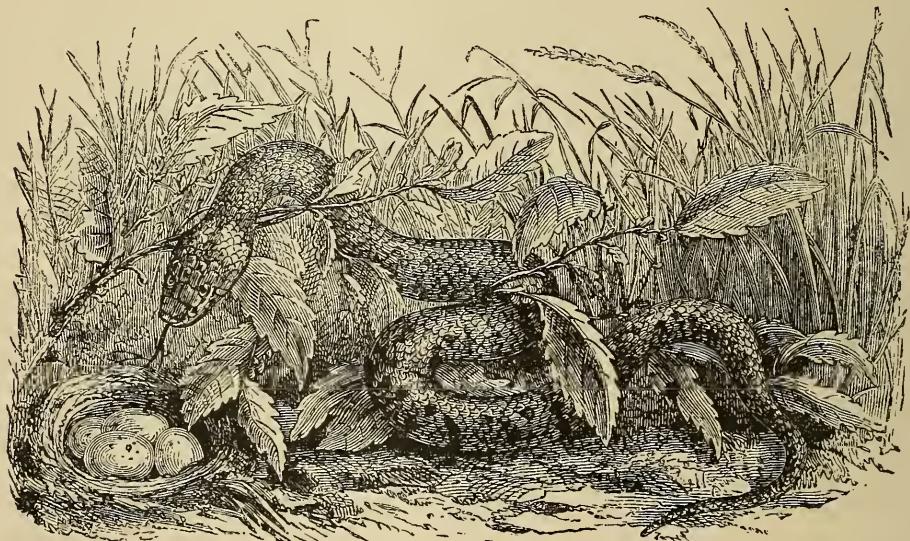
*A CURIOUS FELLOW,*

*That Walks without Feet, Climbs without Hands, and Swims without Fins.*

To begin with, he walks on his ribs, and I dare say you have seen him do it dozens of times, though very likely you never thought how he did it, for you call it crawling.

The curious fellow is a Snake, and in his long slim body he has—besides good strong ribs—powerful muscles, which bring the ribs forward as if they were feet. And on he goes, fast enough to get out of your way when you are after him with a stick. Why, his ribs, aided by his rough scales, are better than a dozen feet to him. Indeed, I don't suppose he would know what to do with such things, if he had them.

Then, as to his climbing, you have doubtless seen representations of this fellow in the picture, climbing trees, by going around



the trunk in a sort of spiral. But that's not the way that real snakes out of the books climb. They press themselves firmly

against the tree, and go up by means of the same useful ribs and scales, the body of the snake being stiff as a stick meanwhile. One can't really see how it is done, but done it is, and in just that way, too.

In swimming, snakes will beat the fishes themselves. They get on in the water, either by an undulating movement of the whole body, up and down, or by the same sort of motion from side to side.

Its way of getting on is not the most wonderful thing about the snake. In whatever way you look at him he is a very interesting object to study. Look first at his bony frame-work. It is hardly anything but one long back-bone or vertebræ column. But try to turn and twist and wriggle your back around, as the snake does his, and you will find you can't do it. The reason he can, is that the bones forming that column are provided with the most perfect ball and socket joint known. They are like your hip-joint, only more perfect, and it would be next to impossible to dislocate his back. As to ribs—which he uses for feet, as I told you—he is plentifully supplied, some snakes having as many as three hundred of them.

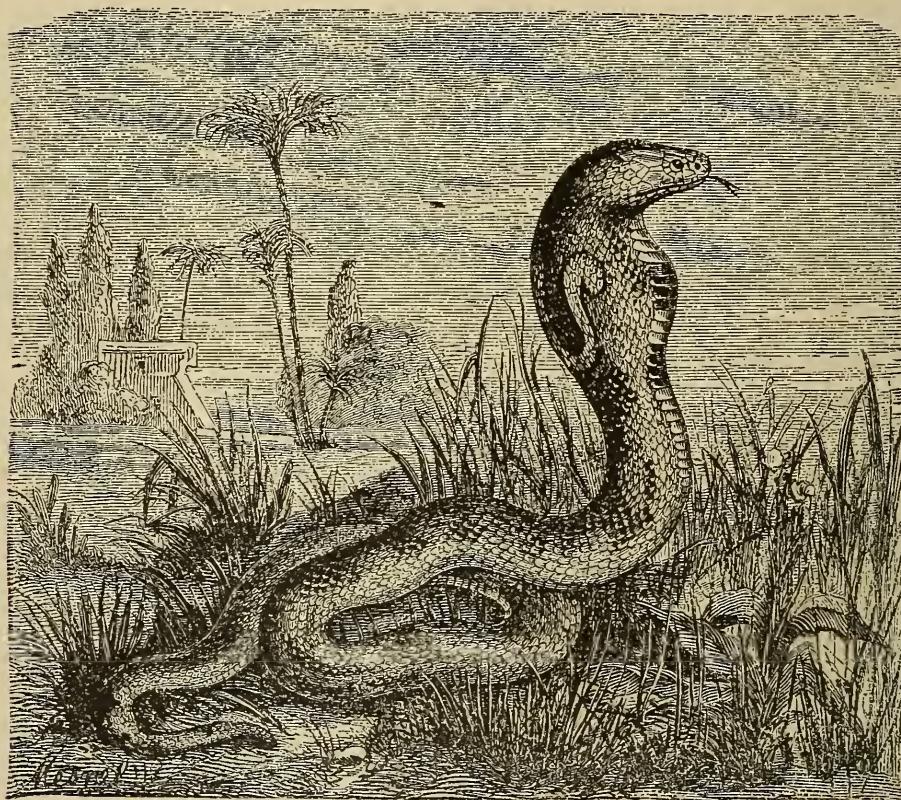
No less wonderful are his jaws. Having no hands or feet, of course he is obliged to swallow his food whole, and very often it is a great deal larger than his mouth and throat. Now, how would you suppose he could manage? That part is provided for in his making, and perfectly provided, too. His jaw bones are not fixed tightly in one position—as yours are—but are so loosely constructed that they can be widely separated. As the snake draws in his food, the mouth gradually grows wider till the bones are some distance apart. When once the morsel is down, the ligaments contract and draw the bones back to place, and his head begins to look natural again. Poisonous snakes kill their prey before swallowing, and Boa Constrictors crush them to death; but those which are not poisonous have teeth, all turning backwards, so that no creature—however lively—can get away after once he is seized by the snake.

The skin of this interesting creature is very delicate, and covers the scales, and as you have no doubt read, it is now and then cast off. Perhaps, even you have found old snake skins in the woods. When the snake is about to shed his skin, it grows very dull in color, and after a while it splits open on the back, and the

slippery fellow wriggles out of the old coat, generally turning it inside out in the operation, and coming out as good as new himself.

The ringed snake—like the picture at the beginning of this article—is a perfectly harmless creature. He eats insects and reptiles, especially frogs, of which he is very fond. He is about a yard long.

But here is a creature of a very different character. This

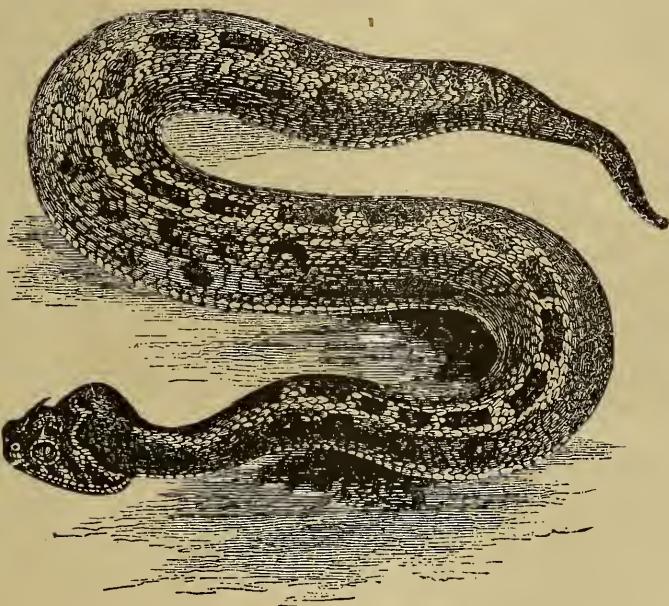


snake, the *Cobra di Capella*, is one of the most deadly of his tribe. He is a native of Asia, and his bite is almost certain death. Yet the jugglers of India take them about to show, tamed, or as they say, charmed. They will dance, or keep time to a kind of monotonous music made by some instrument, and allow themselves to be twined about the charmer's neck, and carried in his pocket. Some people, who have seen this done, say that the snakes' poison fangs are pulled out. But the same serpents which have been

exhibited, have been, immediately afterwards, made to bite some small animal, which died in a few minutes. Cobras are usually three or four feet long.

One of the worst of the poisonous snakes, is the *Fer de Lance*, which is a native of South America. In general, these creatures will not bite unless annoyed in some way, but this South American snake will jump out of the grass, without being disturbed, and bite any one passing. They are very much dreaded, but, in spite of that they are useful. They devour the hosts of rats with which that country is tormented, and which would eat up all the crops, if not kept down by the *Fer de Lance*.

You have all heard of our North American venomous snake—the Rattle Snake. I need not tell you about his peculiar way of warning people to get out of his way, by his rattle. He lives on rats and mice, reptiles and small birds. When the weather gets too cold for him, he retires to some quiet place—a hole in a rock or a cave, or the wet ground, under some patch of long-leaved moss. There he will curl up with five or six other snakes, and spend his long winter.



comes near that ugly head.

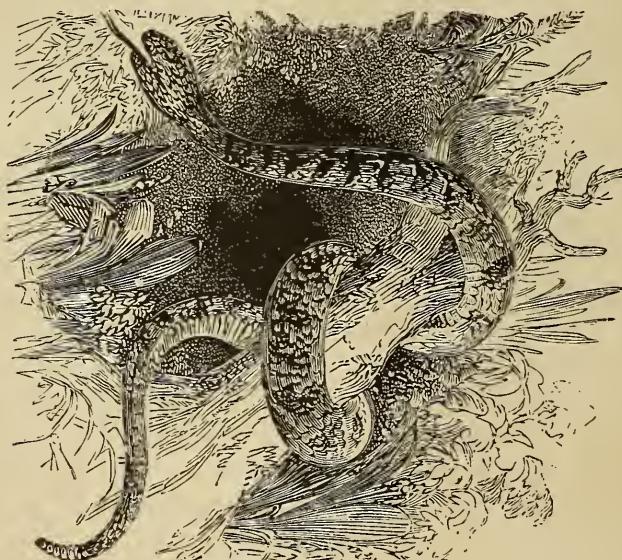
The Boa Constrictors have a very different way of killing their prey, as you have doubtless read. They coil themselves

The last picture I shall give you, is of a Horned Puff Adder, a native of South Africa, and as dreadful as any of those terrible creatures. It is slow in its motions, and is said to spring backwards to bite. It is four feet long, sometimes more. It has a habit of burying itself in the sand, so as only to leave out its head; but unfortunate is the creature that

around their victim and crush it to death. They are very large, sometimes as many as thirty feet long, and their prey is nearly always much larger than themselves. It is wonderful to see what immense creatures they will swallow. Often the shape of the creature can be plainly seen through his skin. After this feat, the Boa is not very lively, nor does he want anything more to eat for some time. He lies quietly till it is all digested, and he is ready for another meal.

What do you think of snakes for playthings? Children in Borneo are very fond of a certain tree snake, the *Boiga*, as a pet. They twine it around them, and tame it. It is a very pretty creature, blue in color, with gold colored stripes. And even in France there is a harmless snake which the children catch, tie a string to its tail, and drive for a horse.

Many people eat snakes. The inhabitants of Cathay consider it the most delicate meat they can get. Brazilians eat the meat of a green and yellow variety. The Sardinians eat the Adder, made into soup. The Negroes in the countries of Anacondas and Boas, eat their flesh freely. But the greatest snake eaters I know of, are the people of King George's Sound, who, being fond of snake meat, and too lazy to take the trouble to hunt and cook them, set fire to the grass, and pick from the ashes the broiled snakes and eat them.



*A BED OF FISH BONES.*

A very uncomfortable bed it would be for you, but just the thing for the little Kingfisher babies. You wouldn't like the house, either, any better than the bed, for it's built—or dug—away under ground at the end of a hole made by a water-rat or some other little animal.



In the picture you can see Mr. and Mrs. Kingfisher. Mrs. Kingfisher sits in a dignified way on a rock, while Mr. Kingfisher has just brought home his dinner. He won't share it with his wife, though. When he wants to eat it, he'll beat it to death on a stone, and then just give it a toss up in the air, and catch it, head first, and—swallow it right down.

Greedy, did you say?

Well, it would be greedy for you, who have knives and forks to eat with, but for this poor little fellow, who hasn't even fingers, not to speak of forks, it's the very best way he can do. And besides, they're not very big fish,—only minnows (perhaps you call them minnies).

He's so determined to beat his food, that when kept in a cage and fed on raw meat, he will not eat it until it is well beaten.

By-and-by, when the water gets still, Mrs. Kingfisher will spy a fish, dart down into the water and bring out her dinner. I said he wouldn't divide his dinner with his wife, but you mustn't think he's a bad husband—far from it. He not only helps her fish for the little ones, when they're hatched, but he sits on the eggs part of the time, so that she can get a little fresh air, and fish for herself.

That's being very, very good—for a bird. Some of them, like our common turkey, are such bad fathers that they'll break every egg and kill every baby. That's why the poor turkey mother has to hide her nest, as you country children know she does. It's not to bother you to hunt her up, it's to protect her little turkeys from their bad father. So you see Mr. Kingfisher is an exemplary husband and father—for a bird.

He's a beautiful little fellow too, with lovely blue back and red breast. He does not sing; in fact he belongs to the family of screamers, and his cry sounds something like a watchman's rattle. He delights in quiet rivers and streams, where he can fish and spend his life in peace. Sometimes he catches more fish than he can eat, and again he catches fish larger than he can swallow. For such emergencies he is pretty sure to have a store-house—some safe hole in the roots of a tree or between rocks. The fish are killed by a bite across the neck, and sometimes as many as five or six are found.

But now and then a sad accident happens to this pretty little fellow. When pretty large, he has been known to catch a fish too large to swallow, and on trying to get it down, it would stick in his throat and choke him to death.

Mr. Wood tells an interesting story of a Kingfisher in England. He attempted to swallow a fish that was too large for him, and of course got choked. While he was floating down the stream, flapping his wings and trying to get the fish down, a large pike stuck his head out of the water, and seizing Kingfisher, fish and all, carried them off—probably for his dinner.

Do you wonder how these little birds make their fish-bone beds for their babies? I told you they swallowed their food whole, so of course the bones are all in. Well, after the fish is digested, the bones and scales remain in the stomach, and not being very

nice to have there, the bird has the power to throw them up, which he does in the nest, to make a nice bed for the eggs. One variety of this family, living in Brazil, lives far away from any stream. He sits on the castor oil plant, and darts on grasshoppers and lizards. And still another of the family living in Brazil, is violet and orange-colored, and eats—centipedes and snails.

But the beauty of the whole family—though every one is lovely—is the Racquet Tailed Kingfisher, and lives in the Malay Islands. His bill is coral red, his back and wings purple, his shoulders and head azure blue, and his breast white.

But that is not all. His principal beauty is his tail. It is all very long, but the two middle feathers are two or three times as long as the bird himself. They are very narrow till near the end, where they swell out into a spoon shape. All the tail feathers are white with narrow tips of blue.

The common Kingfisher has a history. The ancients called him the halcyon, and had some curious superstitions about him, such as that his dead body was a protection against lightning, and also against war. Even now, in some dark corners in France, the pretty little dead bodies are thought to protect woolen cloths from moths, and are called moth-birds. If they do perform that use, it must be by their smell, for it must be confessed there's one very uncomfortable thing about them—they have a dreadful odor, and it all comes from the odd little bed of fish-bones. In spite of their splashing in the water every time they eat a mouthful, and in spite of any soakings or cleansings you can give, the live birds, and even their dead and stuffed bodies, will have the same unpleasant smell.

They have a more dignified name than Kingfisher, moth-bird, or halcyon. In the big, wise book, they are called by the imposing name of *Alcedo Ispida*. But you and I don't care for the wise books yet.

One of the Kingfisher family—some sort of a cousin to ours, I suppose—lives in Australia, and is called "laughing-jackass," from his peculiar cry. He is one of the largest of the family, being eighteen inches long. He's a droll looking fellow, generally sitting humped up on a branch, with his chin resting on his breast. He don't care so much for fish as most of the Kingfisher family, and often lives on the plains, where he hunts insects, reptiles, snakes and small animals, such as rats.

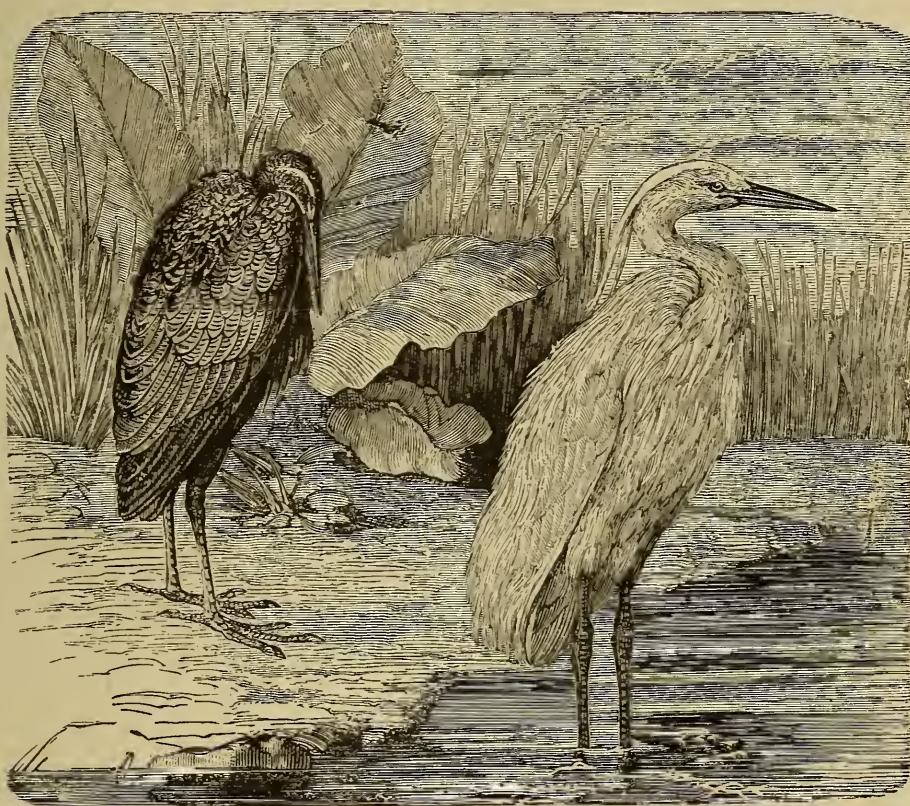
His cry—which gives him his name—is a laugh, and is very startling to one who does not know it. He is very inquisitive, and when he sees a fire he is sure to come as near as possible, and suddenly startle those around it by his dreadful laugh. It makes a panic among the strangers, but those who have heard it before, coolly proceed to shoot Mr. Kingfisher, and broil him over the coals.

This odd creature makes his home in a hollow tree, where he guards the pretty white eggs with zealous care, readily fighting any one who ventures too near.

His dress is olive brown, the wings mostly black, and the breast white. His tail is rather long and of a chestnut color tipped with white. Although he is not so beautiful as some others, he is a very pretty bird.

Another Australian Kingfisher is very fond of crabs and shrimps, to obtain which, he takes up his residence on the sea shore.

He is a noisy bird, and his cry is like the shriek of a person in distress. When a party of these boisterous birds get together on one tree, they seem to exert themselves to see who shall make the most noise, and the result is said to be perfectly deafening.

*WAITING FOR DINNER.*

Isn't that a droll fellow in the picture?—humped up as though he had a fit of the sulks, and never meant to speak another word to his pleasant looking companion.

Well, he isn't so cross as he looks. He's only waiting for his dinner, and that's just his odd way of doing it.

Most birds, you know, when they are hungry, fly around, and hunt up something to eat, but I can assure you, Mr. Heron is altogether too dignified to do any such thing. He generally wades into the water, as you see the pleasant looking one in the picture; then he draws his head and neck down between his shoulders, like the

other one, and waits for some imprudent little fish to come near him.

There he'll stand for hours, often with one leg drawn up under him, and never move a feather, till his dinner comes up near him, when he darts at it quick enough.

If he gets too hungry to wait for a fish, he will sometimes dig up the mud with the sharp claws at the end of his long toes, and hunt out frogs and other unfortunate creatures who live in the mud. He won't refuse rats or mice either, but usually he eats nothing but fish.

When he has babies to provide for, he has to be very busy, for they are hungry little fellows, and there are three or four of them together; so he hunts a long time, till he has enough to feed them all before he goes home.

How do you suppose he carries home his marketing? He has no hands like yours, nor baskets like honey bees, nor pockets like some squirrels.

You'd never guess it, but he has a very convenient place—his stomach. As he catches a morsel, he just swallows it, and when his stomach is full, he goes home, throws out the contents of his comical market basket, and feeds the babies.

He finds this plan convenient, too, on other occasions. He has a very unpleasant enemy, the eagle, and poor Mr. Heron has no way of defending himself from that fierce fellow, but by flying away up above him.

Now, when one has eaten a hearty meal, he isn't so light as though his stomach was empty, so he throws up his dinner in a twinkling, and takes to his wings to get away.

Of course there are several branches of the heron family. Those in the picture are the common Grey Heron, and are a little over a yard high. They live in the most quiet place they can find, near some water, and there's nothing they dislike so much as to have noise and confusion around them.

In olden times, heron hunting was a very fashionable amusement, especially with ladies.

Falcons—birds who are natural enemies to the heron—were trained to hunt them in the air, and large parties of ladies and gentlemen would go out on horseback, carrying falcons on their wrists, as I dare say you have seen in old fashioned pictures. Then, unfortunate was the heron who came in their way.

The most elegant of this family is the white heron, who wears a suit of white, with beautiful, long, silky feathers over his shoulders and back.

Unlucky for him—ladies also are fond of feathers to wear on their heads. So he is hunted, and robbed of the beautiful ornaments, while the common grey heron, as he isn't good to eat, and has no valuable feathers, is suffered to live in peace, since people have found something better to do than hunting him with falcons.

He builds his nest in the top of a high tree, and a curious looking thing it is. It is very large, of course, and roughly made of twigs and sticks. But it is safe, and he likes it.

There's another beautiful white heron, who has a droll way of getting his living. He's about as large as a pigeon, and he lives in the northern part of Africa. He goes into fields where cattle are kept, and catches the flies and other insects that are such torments in that hot climate.

Of course he's very useful, so he is called the ox-keeper.

All these herons belong to the family of waders, because they wade in the water for their food. They all have long legs, almost like a pair of stilts, which are just the things for wading, you know.

*A DROLL CANDLE.*

Did you ever see a bird used as a candle? I don't mean a candle stick, but a regular candle, and burn, and burn, till nothing was left of him but his toes.

You never heard of such a thing?—perhaps not, but it's often done in the Feroë Islands, and here's a picture of the unfortunate little fellow.

He's called a Petrel, and a curious creature he is. He fairly lives in the sea. He flies long distances over it, and is never so happy as in the wildest storms. Then he sails around, and adds his cry to the roaring of the sea, half running and half flying over the highest waves, and seeming to enjoy it as much as you boys enjoy a wild frolic in the snow. Sailors, who are full of superstitions, you know, regard the innocent little fellow as a bad omen, and are sure of bad luck if he gets tired and rests on their ship. He wears a black coat, too, and that's another reason why sailors don't like him. As though black wasn't as harmless a color as blue! They call him "Mother Carey's chicken."

He has a droll way of sleeping. He just makes himself into a little feather boat, sits on the water with his head under his wing, as safe as your canary bird on his perch, and is tossed about at the mercy of the winds and waves—a funny little feather ball.

He can't sink, and he can't get wet, for his feathers are so close together and so oily, that water can't get through them.

Sailors ought to like him, for he is not fond of the land, and is as awkward a walker on shore, as sailors themselves. Indeed, he scarcely ever comes on shore.

Mamma Petrel comes on shore to make her nest, and a droll little home she makes, if she can't find a cozy nook in a rock. Hunting up a sandy beach, she digs a little cave about a foot deep, and there she lays her egg, and brings up her little fuzzy, white baby.

She spends the whole day off on the ocean, and only comes home at night to feed the baby, which seems too bad of the little mother.

Another odd thing about this sea bird, it has no hind toe.

Look at the picture, and you'll see. You know land birds have a toe sticking out behind, that holds them so nicely on to twigs and branches. But I don't suppose Mr. Petrel ever tried to light on a



twig, and I dare say he'd be perfectly amazed to make the acquaintance of land birds, who live among the trees, and never go near the ocean.

He has no time to make acquaintances, however; he's too busy, and can't bear to stay away from his ocean home.

But I forgot to tell you how he is made into a candle. You must know he's very fond of grease and fat to eat—like some boys and girls I have seen. He'll follow whaling ships to pick up any thing that's thrown overboard. And as soon as a whale is killed, and the sailors begin to cut it up, he's there to snatch every bit.

Sometimes there are thousands of the greedy little fellows around.

And now hear what becomes of greedy creatures who eat nothing but grease. They grow so fat that they are very valuable to the poor islanders in those cold countries. So, no sooner do they make their nests, and prepare to bring up the one baby Petrel each, than these men hunt them up, steal their eggs to eat, and carry off and kill the fat fathers and mothers.

After they are killed, their bodies are squeezed to get out the oil, and sometimes—more dreadful still—a wick is drawn through the fat little body, and set afire, and there it burns—as I told you—lighting up some rude hut, till nothing is left of the gay little Petrel but his toes.

Think of that dreadful fate, and don't eat too much grease!

While we find fault with his greediness, we musn't forget that he's a very useful bird. He is put on the ocean to perform a necessary duty, and nobly he does it,—there's no shirking about him.

His duty is that of a scavenger. He, and others of his family, take care of all the disagreeable things left floating on the sea, and sailors, if they only knew it, have reason to thank him for his services, instead of abusing him.

The name Petrel means "Little Peter," and he gets it from his habit of running on top of the waves, with help (of course) of his wings.

There's another Petrel—a sort of a cousin to the stormy Petrel, I suppose—very common in the Arctic regions, and very valuable to the people who live there. He is as fond of grease as his little relation, and he is able, when alarmed, to throw up a large quantity of clear oil, which is valuable to sell. The birds seem to know their danger, for they build their nests on the highest precipices, on the little shelves always to be found in such places. One would suppose they would be safe in such places, but men have contrived

ways to get at them and rob them, not only of their oil, but of their eggs.

By means of ropes and such helps, the people get within reach of the nests, and then proceed to gather eggs—if it is the egging season—or oil, if it's late for eggs. Every bird, on being seized, throws up the oil, and by having a dish of some sort ready, the captor can secure it all.

This Petrel is not black. He is gray on the back, with a white head and breast. When full grown he is about twenty inches long.



*WHO ! WHO !*

"Who! who! who! who!" That's what he says, and as he asks it in the night, and in a very loud voice, he is held in particular terror by naughty boys, and superstitious people in general. Isn't he a wise looking fellow? He's the very king of the Owls, with his aristocratic horns—though they're made of feathers—and his great size—two feet high.

This personage is called the Great Horned Owl, and he

dresses in a neat suit of brown and black. He is no common bird, living in some tree, and flying around in the vulgar daylight after his food.

By no means! As long as there's a streak of sunlight, Mr. Owl stays quietly in his home, which is usually in some old tower, church-steeple, or old hollow trunk.

They do say he can't see much by daylight, and if you catch one he seems rather stupid, and almost blind.

However that may be, as soon as it's dark, he prepares to go out for something to eat.

When he starts off, and gives his eager cry of "Who! who!" the rabbits, and rats and mice and such little fellows, take to their holes as fast as they can run. I suppose it means to them—

"Who shall I have for my supper?"

But in spite of their fright and hiding, Mr. Owl manages to find enough of them to eat, adding frogs, toads, and such creatures, when he has a house full of hungry owlets.

There's one very curious thing about his eating. When he catches a mouse, he first breaks its bones with his bill, and then swallows it whole—fur, bones and all.

Now, bones are not very nice to have in the stomach, so after a few hours, Mr. Owl opens his mouth, and throws up the bones and fur, made into a ball, as I told you the kingfisher does.

A very convenient stomach, that must be!

Another of the Owl family is more nice in his eating. He is a little fellow, called the Sparrow Owl, and is about as big as a robin. He kills small birds, and actually picks them before eating.

The big horned fellow in the picture, can be easily tamed. He will learn to know his name, and come when he is called.

I've read an interesting story of a great Owl, whose baby was caught and shut up in a hen house. I suppose the little fellow cried, and his mother heard him, for every night she brought him something to eat, till he was big enough to take care of himself.

Another American Owl, the Burrowing Owl, has a very bad character. He is about as large as a pigeon, and he likes his house under ground. But I'm sorry to say he doesn't like the trouble of digging it, so he goes to a cozy little home, burrowed out by some quiet little prairie dog, who isn't strong enough to refuse him admittance. There he takes up his residence, in spite of the owner, and there he lives with the family.



I hope he don't pay rent by eating a young prairie dog now and then, though some people say he does.

There's a variety of the Owl family that you country boys know well enough. It's called the Barn Owl, or Screech Owl, and I must admit the last name is very appropriate. Many farmers and country boys have a great prejudice against this little creature, and take every occasion to kill him.

But so far from being troublesome, he's the most useful servant a farmer can have, for he is a wonderful mouse-catcher.

He's always hungry himself, and to supply the wants of his greedy young family, both Papa and Mamma Owl have to hunt hundreds of rats and mice. One pair of these feathered mousers is worth a dozen cats.

Owls live almost all over the world. Even Greenland, the frozen land of the north, has its snowy white Owl.

This poor fellow has a very thick coat of feathers and down, to keep him warm, and his white color allows him to travel over the snow unseen, and to catch his food, what little there is of it, in that bleak country.

When an Owl is afraid of being caught, he tries to make himself look more formidable by swelling himself out as large as possible, spreading out his wings and tail, hissing, and snapping his bill together fiercely. But he can't look very ferocious—let him try his best.

Here is a picture of the baby Owls—looking out of the door of their home. Probably waiting for their dinner.



Not all Owls cry "who! who!" There is another of the family—the Scops Eared Owl—that cries "kew, kew," in a sort of plaintive voice, that is really quite touching till it gets to be tedious, for this little fellow—only seven or eight inches long—will keep up his tiresome cry all night, as regular as the ticking of a clock. This Owl is too small to make war on mice and such large creatures, so he lives on beetles, grasshoppers and such little fellows.

Another of the family, that is generally found in our country, the Virginian Eared Owl, is one of the large ones, and very fierce. He does not confine himself to mouse diet; indeed, squirrels, ducks, sparrows, partridges and many other unfortunate little creatures

are easily caught and eaten by him. His special dainty, however, is turkey—in which I'm sure he shows his good taste—but killing a wild turkey is no easy undertaking for an Owl, so he resorts to stratagem.

His plan is to sneak around quietly till he sees a wild turkey fast asleep, and then pounce suddenly down on its back before it wakes, when he can easily dispatch him. But sometimes the turkey hears him coming and ducks its head and spreads its tail out flat over its back. Mr. Owl alighting on these stiff slippery tail feathers, slides off, and the turkey slips into the brush before the disappointed Owl knows what is the matter.

This savage fellow, however, does not disdain tame turkeys, nor chickens, and he was a great nuisance to the early settlers, because he seemed to think poultry yards were made for him to hunt in. Many an Owl has lost his life by the gun of the farmer.

I have somewhere read a story of a young Owl which was caught and tamed. He made friends with the family cat, who had some young kittens to care for. He would cuddle up to pussy's warm side, and she would purr his welcome. The cat showed her good will also by giving mice to him as well as her own kittens.

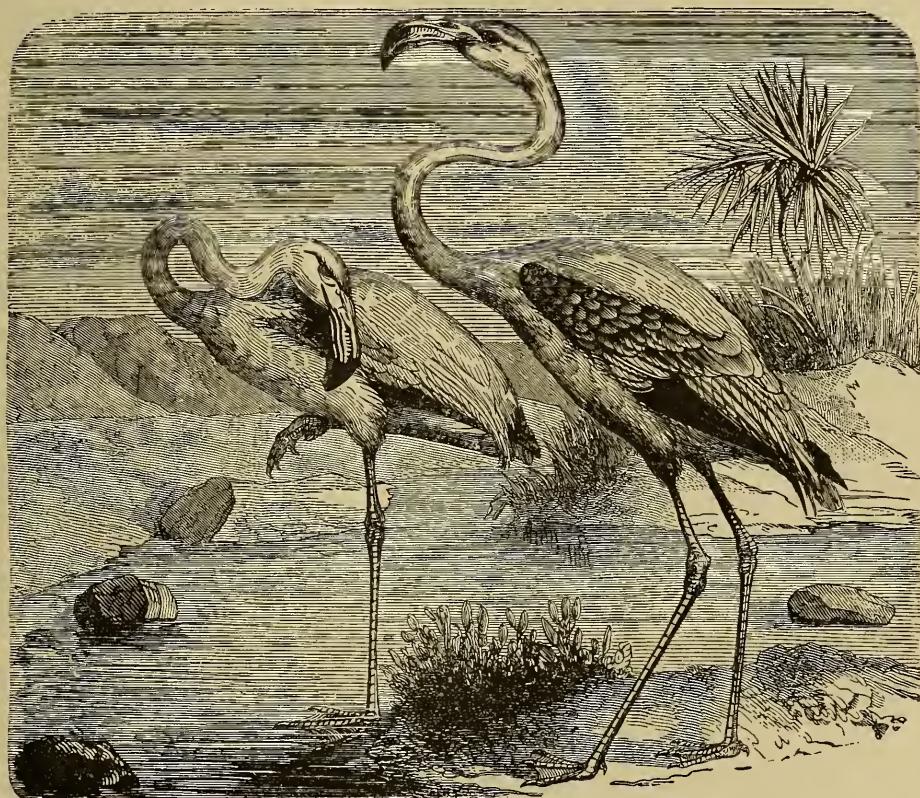
He lived in this pleasant way for a long time, and the only trouble that ever came between them was when the kittens played with a live mouse, as kittens will. When the Owlet saw that, he seemed indignant, and would rush out and bite the mouse on the back of its neck, of course killing it at once. He would then walk off and leave the kittens to play with the dead mouse.

Mr. Wood says that Owls have two ways of eating. To dispose of a mouse, it is thrown up into the air and caught head first in the Owl's mouth. It is quickly swallowed with the exception of the tail, which hangs out one side of his mouth, and is rolled back and forth for two or three minutes, then jerked down his throat.

But if the morsel to be eaten is a bird, he proceeds quite differently. He tears it to pieces, and partly pulls out its feathers, before eating it.

*STANDING ON HIS HEAD.*

Standing on the head isn't a very elegant position—is it? Men, and boys, too, for that matter, look more interesting on their feet, though I don't suppose there ever was a boy who would care how he looked, provided he could truly stand on his head.



Well, droll as you may think it, I have read in some of the big books, that there is a bird—an American bird at that—who delights in standing on his head! Now, don't you suppose that innocent and dignified bird would be surprised to hear such a piece of slander about himself?

This feathered personage has a curious way of getting his dinner, I must admit, and he does *look* as though he used his head for a third leg. This is how it is: he always lives on the bank of a

river or pond, and he likes for his dinner, the little frogs and worms that live in the soft mud under the water. But he might watch all day, and starve to death, for all the dinner he would get, if he was not pretty sharp in his hunting.

He wades into the water (he belongs to the family of Waders); then he goes on to stir up the mud with his feet, and frighten the little fellows out of their mud houses. Not having hands, he needs something to catch them when they are out, so he just lays his head down by the side of his feet, *top down*, and uses his open mouth for a market basket! Isn't that the funniest basket you ever heard of? It would not seem so odd to you, if you could see the bill, for it is as big as all the rest of his head, and shaped more like a canoe than anything else, as you see in the picture. So it does very well for a basket.

He looks very droll in that position, and it is no wonder the first men who saw him standing that way, thought he stood on his head.

This bird—did I tell you?—is the Flamingo, and you could see him any day, if you lived near any of our Southern lakes or rivers. That is, you could if you were very quiet, for he is extremely shy, and will keep out of your way if he can. They go in flocks, and some of the sharp eyes are sure to spy a hunter. But they are not afraid of cattle, and so men dress themselves in the skin of an animal to hunt them.

He is worth seeing, too. He's no dull-coated fellow, hopping about on two dumpy legs; by no means!—he wears a whole suit of the most brilliant rose-color, and he stands up gracefully on two long, slender legs. His body is elegant—as I said—and his neck is as long as his legs. He is four or five feet high.

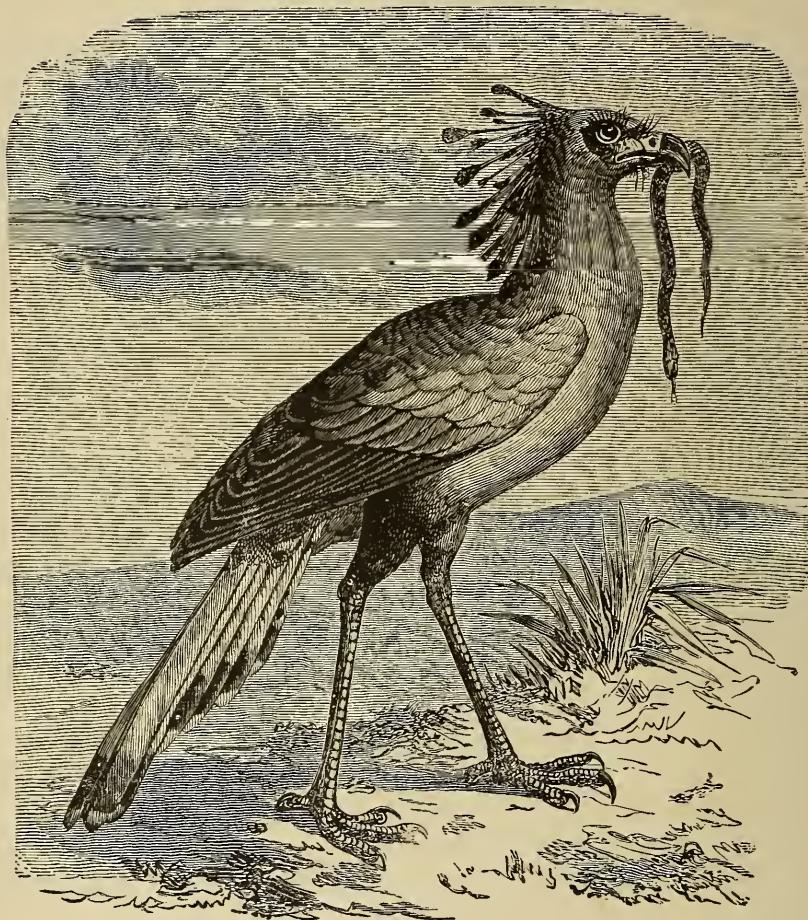
Mamma Flamingo makes a curious nest. It is sort of a small hill of mud, a little scooped out on top. There she lays her two or three white eggs, and there she sits—like any old hen, only she can't curl her long legs under her, as a hen can, so she lets them hang down outside.

The babies are droll, little, dull-coated fellows, and do not attain to the dignity of red suits till they are two years old.

In old times Flamingoes were eaten, and thought to be very nice, especially the tongue, and I have read of emperors who kept quite an army of men for nothing but to hunt the unfortunate birds, that he might have their tongues for his table.

Nowadays we think Flamingo meat has a marshy taste, and we prefer ducks and turkeys for our tables. So he is hunted only for his beauty, to adorn museums and bird collections.

He is called Flamingo from his bright color, but he is said, in the big books, to belong to the *Palmidactyle* family. He has this graceful name merely because his three front toes are united by a wide skin—something as a duck's toes are—and his one hind toe is very small or absent entirely.

*HOW CAN HE EAT IT?*

Would you think such a fine looking fellow as this bird would eat a snake?

To be sure, you can't always tell by the looks of one what he eats. Some very fine looking birds are regular scavengers, and made on purpose to live on things no one else will touch.

This big fellow—the Secretary bird—is specially fitted to kill and eat snakes. So well does he do his duty, and so many of the disagreeable creatures does he eat, that he has been imported to places infested by them, as we take a cat to a house infested by mice. He never fails to clear them out, and adds rats, mice, lizards, grasshoppers, and any other fresh meat he finds prowling around.

It is a curious sight to see the Secretary bird kill a snake, for of course he don't hang so quietly as that one in the picture, till he is dead; nor would a wriggling live snake be very nice to swallow.

Snakes, you know, spring at their enemy, and try to bite him. The bird is prepared for this trick. His wings are very strong, and he holds one before him, as a sort of shield, for the snake to strike against, while he hops around and beats him with the other wing, till the reptile is somewhat discouraged. The bird then catches him up in his bill, and throws him up in the air several times. This stuns him, and the bird crushes his head, and proceeds to swallow him whole, if he's small enough; if not, he first tears him to pieces.

As you may imagine, this bird is a native of countries where there are plenty of snakes to be eaten—such as South Africa,—and the people know enough to appreciate his services. It is said they are in the habit of catching him while young, training him, and keeping him among the chickens as a general protector from snakes and rats. He seems to understand his duty, for he not only eats all their enemies, but puts a stop to all fighting between the fowls themselves.

When the time comes for the mother-bird to make her nest, she hunts up some quiet, well-hidden place—some thick bush, or high tree—and makes her nest, filling it with feathers and down. Then she lays two or three white eggs, and in this snug feather bed the little birds live three or four months, till they are strong and well able to take care of themselves.

This bird, as well as many others who swallow the food whole, has the convenient faculty of throwing up the bones, feathers, and fur, which are left in the stomach after the meat of its prey is digested.

Perhaps you think he has a curious name. A secretary is a man who writes a good deal, and in olden times, before gold or steel pens were made, every one used pens made of quills.

When a writer wanted to lay down his pen, he would often stick it over his ear, as you sometimes see lead pencils placed now.

This bird, as you see in the picture, has feathers sticking back of his head, which look something like the quill pen of the old-fashioned secretary.

I must say I think it's an awkward name, but the learned men did not improve it much when they called him *Secretarius Serpentarius*.

He has another common name, though. He is sometimes called the Messenger bird, because he can run so fast on those long, slim legs of his.

Can you see any reason why this bird, and other birds who live by killing live creatures, hatch only one or two eggs at a time, while hens and other fowls hatch six or eight? It is one of the wise provisions of nature to keep things even over the world.

If birds of prey had large broods, they would soon exterminate every kind of reptile and creature they feed on. And as every creature is useful in some way, no one can be entirely spared.

The Secretary bird has the honor of still another name among the Arabs. They call him "Thirty-ears."

I want to tell you what one man found in the stomach of a Secretary bird, just to show you how much he can eat. There were eleven medium sized lizards, eleven small tortoises, a great many insects, and three snakes as thick as a man's arm. What do you think of that for a dinner?

A Secretary bird is not very often killed, for he is so useful that no one is inclined to do so, and besides the killing of one is forbidden by law and punished with a fine.

You see what long legs he has, his walk is said to be something like the walk of a person on stilts, but his run is something wonderful. Nothing can overtake him, and the Arabs call him—among other names—the Devil's Horse.

The Secretary bird is about three feet long, and he wears a suit of dark gray, trimmed with black, and having a white tip to his tail.

*BLACK WATER-BABIES.*

You know what a fuss our hens make if they chance to fall into the water, how they flutter and "squawk," and if they don't get out, they are sure to drown. Well, here in picture on next page is a droll black Hen, who goes into the water herself, swims and dives, and more than that, she takes her little black fluffy babies in with her, almost as soon as they get out of the shell.

She doesn't look exactly like her cousins who live in your hen-coop, does she?

In the first place, she has long toes, with sharp claws. Look at them. They are so long that she can walk on the leaves of water lilies and not sink. Then she wears a black coat, and has some queer ways about making her nest.

She generally selects a low branch of a tree, which hangs over the water, or a snug place among the reeds, as you see in the picture. She builds the nest of weeds and grasses, so that it looks like a bunch of dried grass, and no one suspects that it's the home of such a lively family.

When she leaves the nest, she usually covers it up with some of the same grass the nest is made of, to hide her precious eggs from thieves.

The thief she dreads the most is the crow, who's extremely fond of eggs, and sure to be prowling around after his breakfast.

Then I have heard of boys who would steal the poor little black mother's eggs, and even her house, too, sometimes.

Unless she is frightened off, and leaves in a hurry, Mamma Water-Hen is sure to cover up the nest, and then it looks so much like a pile of weeds and hay, that it is pretty safe.

When the chicks are once out of the shell, their black enemy, Mr. Crow, lets them alone, but as soon as they go into the water, another prowling thief awaits them. That's a fish—Mr. Pike—who comes quietly up under one as it swims about, opens his big cave of a mouth, and snaps it up in a minute.

That seems cruel. But after all, it isn't any worse than the Water-Hen herself does. If her babies are eaten by birds and fishes, she herself eats worms and insects, and even small fish.

*WATER-HENS.*

One of the family—the purple water-hen—wears a dark blue dress, and it's funny to see her eat. She isn't so vulgar as to swallow her food whole, by any means! She takes it in one foot and eats it daintily, as, perhaps, you have seen a parrot do, standing steadily on the other foot meanwhile.

This industrious little mother isn't satisfied to raise one brood, as our hens are. The chicks need her care but a short time, and she often raises three families in a year.

This is a very shy family, and you'd have to watch a long time before you would see them all out, for they are apt to hide behind the broad leaves of the water-lily, or among the weeds on the edge of the stream, in the daytime, and only come out morning and evening to frolic in the water.

When pursued by hunters, they dive and come up a long way off, out of the way of the enemy.

They are about as large as our hens, and the big books that tell all about these curious little creatures, say that they are migratory. That means that they emigrate to a warmer climate in the winter. In some places, however, they stay all the year round.

But they spend neither their summers nor winters with us, for they are found only in Europe.

The Water-Hen is very common in England, where it is easily tamed and induced to live in the poultry yard. But it is apt to do mischief in the garden, for it eats currants, and strawberries, and peas, and the leaves of cabbages, and of course is not very popular with gardeners.

*AN AFRICAN NINE FEET HIGH.*

A splendid fellow he is, too, weighing sometimes three hundred pounds, and strong enough to kill a panther with one blow. Perhaps you think one of that size must be clumsy, but he is very far from that. He can run ever so much faster than a horse, twelve or fourteen feet at a leap.

Is that hard to believe? Perhaps it will be easier when I tell you that he isn't a man—but an Ostrich.

No doubt you have seen that foolish story about him, that when he is pursued by men he sticks his head in the sand and thinks he is hidden. That is a base slander. He is not so stupid as that. On the contrary, he is very cunning. He has no need of strategy himself to get away from a man, for his long legs—as I said—carry him off faster than the fastest horse. But when he has a young family to protect, it is different. The whole family go out together—Father, Mother, and all the little ones—lots of them there are, too.

Unfortunately for the Ostrich, nature has adorned his wings and tail with exquisite feathers, which you girls delight to put on your hats, and so men go out to hunt the poor creatures. They are very shy, and hard to get at, but if the hunter does manage to get near enough to shoot, no sooner does Papa Ostrich catch sight of him than he sends Mamma and the children off at full speed, while he runs the other way and rolls on the ground as though he was hurt.

Of course the hunter rushes towards him, thinking he can easily catch him, and he is the most desirable anyway, for the little ones have not the valuable feathers. After the family have got a good start, and before the hunter gets too near, the cunning bird springs suddenly to his feet, and fairly skims over the ground.

Another way of hunting them, practiced by the natives, is very funny. One of them puts an Ostrich skin on to a sort of cushion which he takes on his shoulders. Through the long neck of the bird he thrusts a limber stick, holding one end in his hand, his black legs he whitens, and thus dressed he walks out towards

the birds, pretending to eat and shaking himself out, as much after the fashion of an Ostrich as an African can.

At first they stare and are a little shy of him, but finally make up their minds, I suppose, that he is only an unusually awkward bird, and so they pay no more attention to him. Pretty soon one of them falls dead, shot by a poisoned arrow. That frightens the rest, and away they go, the sham bird among them, and every few minutes, as long as he can keep up, another one falls dead, till sometimes he kills eight or ten.

They are often hunted by several men and horses, when it is not as easy to get away as it is from one. The hunters make a ring and drive the birds around in it till they are exhausted, and then rush in and knock them down with clubs. When they are dead the hunters take off their skins very carefully, and stretch them on trees or something to dry. Then the fat is boiled down and put away in curious bottles, made of skin from the thigh and leg of the unfortunate birds. The flesh is eaten.

A singular thing about these birds, is the way they bring up their babies. To begin with, there are a good many eggs in the nest; and they are the eggs of as many different mothers, (Mr. Darwin says). The Ostrich does not lay an egg every day, as a hen does; they are so far apart that they would not hatch out together. So—as I said—when a bird prepares a nest, all her friends contribute an egg apiece, and I suppose she returns the favor in due time.

Then the feeding is another odd thing. You know our birds leave the little ones in the nest, and both Father and Mother go off to hunt worms and other food for them. But no such way will do for baby Ostriches. Both parents stay at home to protect them, and other Ostriches—nurses, I suppose they ought to be called—come and lay eggs for the babies. When they need a lunch, one of the eggs is broken and they are fed.

Ostrich eggs are much nicer than hens' eggs, and one of them weighs three pounds, and is equal to about two dozen of the hen's.

They are very convenient for the hunter to find in the desert, for they not only furnish a delicious meal, but the dish to cook it in. He just sets the egg on the fire, breaks a hole in the top, and puts in a stick to stir it, and when done, he eats it out of the same dish.

The natives use the shells instead of cups and pails, to bring

water. A native woman takes a bag full of shells which have only one hole in them, carrying it off on her back, and returning in the same way with the shells full.

Of late years people have taken to raising Ostriches, as we raise chickens. They collect the eggs from the nest, hatch them in ovens, and bring up the young birds by hand. Of course they are perfectly tame, and are kept in large yards, with only a common fence around. Either because they have no wild mother to teach them, or because they are contented where they are, they never try to cross the fence. When grown they are worth one or two hundred dollars each. There must be something about slavery uncongenial to development, for the domestic Ostrich feathers are never so fine as those that grow on their wild brethren.

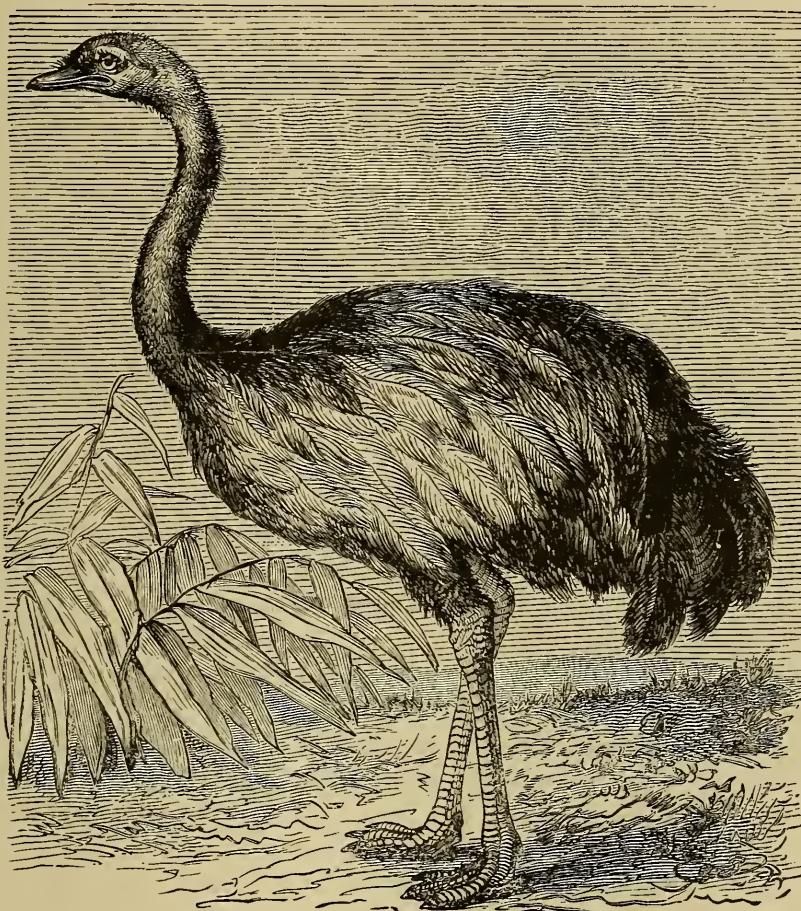
The Ostrich eats grain, roots and grass, and has a fancy for stones, bits of brick, nails and such things. This isn't so strange as it would be in you, for he needs them to help cut up the food in his gizzard. Whereas, you have teeth to cut yours, and no gizzard at all.

This handsome bird is said to be somewhat vain, strutting about in the sun, fanning himself with his wings, and seeming to admire himself very much. I don't know as he can be blamed very much for that, for he is a splendid fellow—as I said in the beginning.

The bird in the picture is not the African Ostrich. It is the American Ostrich, or the *Nandu*, and its home is in South America.

There's one curious thing about the *Nandu* family—the father takes care of the house, or nest, making it himself, sitting on the eggs, and taking care of the little ones. He makes the nest in some quiet place among bushes, or weeds, and it consists of a shallow hole, with dried grass laid in it. When the nest is ready the anxious Papa kindly allows his wives—of which he has six or seven by the way—to lay eggs in it, till there are as many as he chooses to take care of—some writers say fifteen or sixteen, and others thirty or forty. You can believe which you please. When there are as many as he likes, he takes possession of the nursery, and his wives politely retire to some distance, though not very far, while he does his sitting. He is very faithful, sticking to the nest till he is almost run over before he will leave, and only leaving it when the sun is hot.

About the beginning of February, the baby *Nandus* begin to come out of the eggs, and then the careful Papa takes them out in the neighborhood for something to eat.



For four or five weeks, they do not see their Mammas, but when they are as old as that, the family gradually gets together again, and all go in one flock. They eat grass and clover, and are specially useful in eating the seeds of a plant which bears burrs that do great damage by getting entangled in the wool of sheep.

At all times, too, they eat insects and snakes, and other small reptiles.

These birds are very valuable to the people where they live, and are hunted with the lasso, and sometimes with dogs. The flesh is eaten, and the fat made into oil. Of the skin of the neck, bags are made, and the poorer feathers are woven into beautiful rugs. The best feathers are almost as valuable as those of the African Ostrich, and the next in quality are made into dust brushes.

The eggs also are much liked. One *Nandu* egg is equal to fifteen hen's eggs, and it cooks in its own shell, in the same way as those of his African namesake.

They are said to live fifteen years, and are easily tamed, being in fact, afraid of nothing but an Indian, whom they seem to recognize as an enemy at once.

*A HOUSE ON AN ISLAND.*

In the middle of a pretty little lake, in a certain park that I sometimes visit, is a lovely little island.

It isn't much bigger than a good sized room, and is covered with grass and small trees.

In the middle of it is a house, the very cunningest one I ever saw. It is made of rustic work, as you've seen sofas and chairs in gardens, and is all overrun with vines.

There's no way to get to this pretty residence, but by boat, or

by swimming, so of course boys and girls who go to the park, can only look at it from the shore, and wish they had it for a play house.

It isn't put there just to look at, however. Little as it is, it's the home of quite a family—Papa, Mamma, and six or eight babies. The parents are white as snow, dignified and majestic in their movements, and very haughty to the common residents in the neighborhood, who don't live in an elegant home on an island; but the children wear neat gray suits till they're grown up.

If you want to see these aristocratic islanders, look at our picture. I think their house must be over behind the trees on that island.

We call them simply Swans, but the men who make the big books, and give hard names to all the pretty birds, call this family *Lamellirostral Palmipedes*.

Arn't you glad you needn't twist your mouth over that awful name?

Children who visit the park where these beautiful creatures live, always carry pockets full of bread or crackers to feed the swans, and as soon as they see a party of children, they come up to the shore, expecting a lunch.

When the children—the swan children, I mean—are young, it's very interesting to see the whole family out for a sail. Papa swan goes ahead to keep off any meddlers, and Mamma swan keeps behind to protect them from that way. In fact, they're very exemplary parents, both father and mother being ready to fight any one who disturbs their funny little gray babies.

Besides being beautiful, this swan family is useful. They destroy weeds at the bottom of the pond, and so keep the water clear and sweet.

It's amusing to see them digging away under water, to get up some tough weed. They don't go down like a fish, but they turn a sort of summerset, sticking their heads down, and leaving their tails standing straight up out of water. It's the drollest sight you ever saw, and looks as though they were standing on their heads.

In olden times, people used to eat swans, but they're not very good, and we prefer ducks and turkeys.

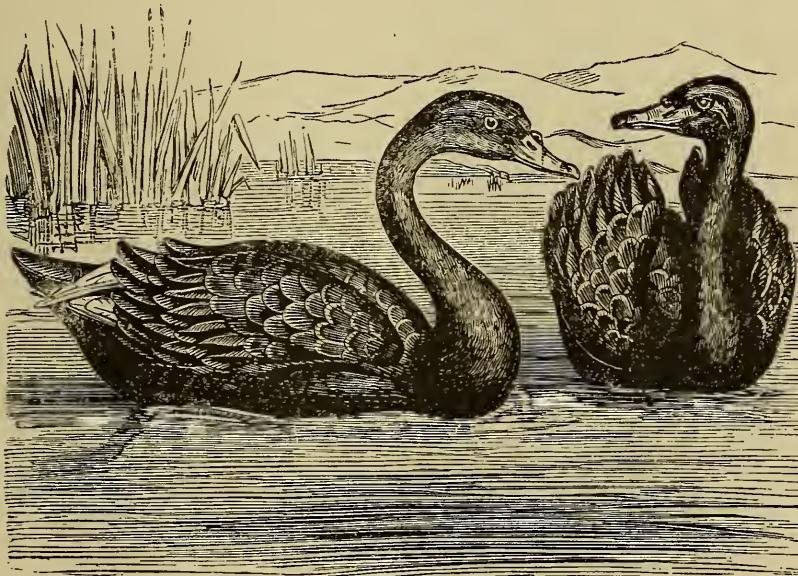
Besides domestic swans, there are several kinds of wild ones. One, called the whooping swan, lives in Europe and Asia, and makes a harsh and unpleasant cry.

For though the swan is the most beautiful water bird, it is neither sweet voiced nor good tempered.

In fact, I'm sorry to say, he's generally very quarrelsome and cruel. He's apt to fight, not only other birds, but his own brothers. He fights with his wings. Maybe you think them rather poor weapons, but he makes wonderful use of them, and don't hesitate to attack even eagles and small animals who have a fancy to eat him, or his babies. And he usually beats them off, too.

In some countries, people take advantage of the cruelty of swans, to catch them, for they are usually careful to keep out of the way of men and guns.

The hunter makes a sort of hut of branches of trees, and puts before it stuffed ducks or geese. Then he hides in the hut, and waits for the swans.



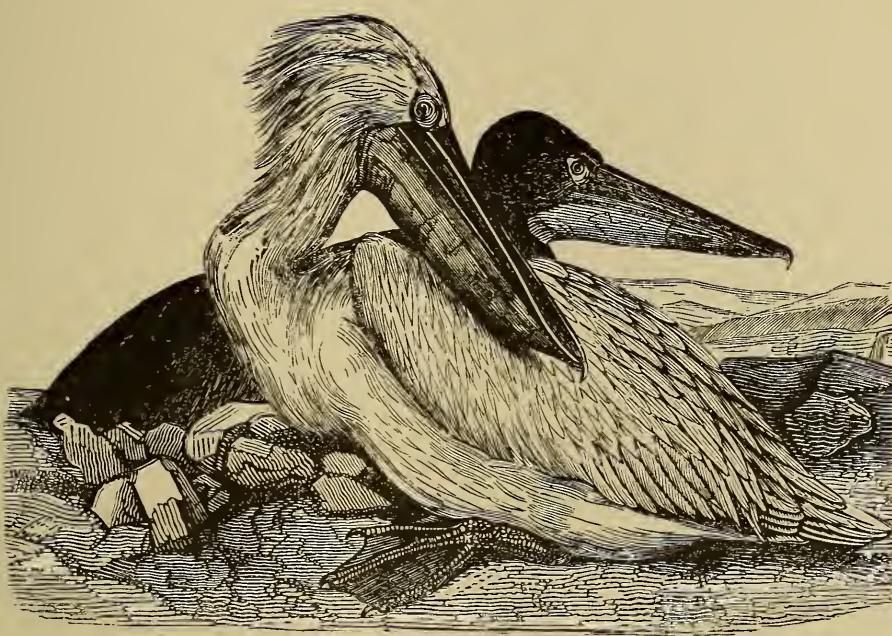
As soon as they see the ducks, they come rushing down to seize them, and the hunter shoots them in a minute.

Not all swans are white. One kind, living in Australia, dresses in deepest black, and is taken to other countries as a curiosity. But black ones are not nearly so beautiful as their white cousins, and are very shy, too.

What do you suppose such beautiful creatures eat?—rose leaves and sponge cake?

Well, I don't suppose they'd refuse the sponge cake if it was offered them, but when they can't get it, they eat insects, worms, and even frogs.





### WHAT I CAN SAY FOR MYSELF.

I am an ugly looking fellow, and I know it. But if you are well taught, you have heard the old saying, "Handsome is, that handsome does," and the big, awkward looking bill that I carry is one of the most useful things that a bird can have. In fact, I can't imagine how I could get along and feed my family without it. Besides, it isn't half as heavy as it looks.

I'm a Pelican. That is, you call me by that name, though the men who make the big, wise books, where my history is all told, have given me the unpronounceable name of *Pelicanus Onocrotalus*. There's one comfort about it, nobody tries to speak it but others of their kind, and they know how.

Well, I live on fresh fish, and so do my babies, and we can't buy it of fish wagons as you can, either. We have to catch every one ourselves. While the children are young, I have busy work to

keep their stomachs full, I tell you, for we are a family of hearty eaters — greedy, those musty old bookmakers call us.

What makes my bill so large, is the bag which hangs down under it. This bag is made of elastic skin, and you'd be surprised to see how many fish I can pack into it, to carry home. I belong to the Aquatic birds, so I have webbed feet, like ducks and geese, and of course I can swim.

Now when I want to fish, I just swim around and wait for one of the foolish fellows to come near the surface. I scorn to dive under water for my dinner, as some of my family do. As soon as I get sight of a shining side, I go for him, (if you'll allow me to use the slang.) It's a very lively fish who can get away from me.

Well, I put that one in my bag, and wait for more, and I stay till I have filled my bag. Then if my wife is busy with home duties, such as sitting, so that she can't fish for herself, I go home, empty my bag before her, and we take our meals in a respectable way, like dignified birds. We never bolt it alive, as some greedy fellows do.

When we have a family of hungry babies, we both fill our bags, and feed them. It is no small matter to keep them supplied, I can tell you, for we are not small birds, satisfied with a worm or two.

We are as large as swans, and we have fine great wings, with which we can fly as well as any of the little birds.

Then, if I'm not handsome, I am at least neat and modest about my dress. I never flaunt in gaudy colors, as parrots and flamingoes do. I dress in simple white, with black trimmings, and my wife wears the same; but we keep the children in plain, sensible gray till they are full grown.

I don't know that you young folks will ever see me, unless you travel about somewhat. We don't like your cold climate. We prefer the sunny South. Africa and South America are favorite places, and of course, as we eat only fish, we live near the water.

But we're fond of traveling, and we always go in flocks, being sociable birds.

The nest we make for our little ones is always put in some snug, dry place among the rocks. It is made of sea-weed and other water plants, lined with feathers or something soft, and is very comfortable, I assure you. We bring up only two or three babies together.

I don't see how birds can endure the immense families some

of them have. It would be impossible for me to feed so many, I'm sure—and have anything to eat myself.

Our family has its aristocratic members, like most other families. One of these is called the Crested Pelican, because he wears a sort of crest on his head, but in other respects, he's no better than the rest of us.

Another is called the Spectacled Pelican, because he has a piece of naked skin around the eye, which makes him look as though he had on what you call spectacles. It is rather curious, but I must say I don't admire it myself.

There used to be an absurd story about pelicans. Even the books written by scientific men, repeated the story. But it is now an exploded humbug, and I tell it to you to make you laugh.

It was said that Mamma Pelican pierced her own breast with the hook she has at the end of her beak, and fed her children on her own blood. And she was held up as a model mother, above all common mothers who feed their babies on fishes, worms, and such things.

But of course that is an absurdity. She presses her beak against her breast for the simple purpose of emptying her bag of fish—as I should think anybody could see.

And now you know better than your grandpa did.

*THE BIRD WHO CARRIES A PICKAXE.*

Not an iron one—such as men work with—of course, but a neat little bone pickaxe, just fitted to his size, and hard enough to bore holes into solid trees. Not that he injures solid trees, as people used to think he did; he much prefers a hollow tree, or one dead inside, for his nest. For his food—which he digs out with

his pickaxe—he only goes where the worms already are.

To make the nest, the Woodpecker finds a hollow tree, which he can tell by tapping on it. Then he cuts a passage from the outside, hollows out the nest in the dead part, makes a bed of wood-dust or moss, and there's his house all ready for his family.

Another curious thing about this little worker, besides his pick-axe, is his feet. His toes, instead of standing three one way and one the other—like most birds—stand in pairs, two each way. That is so that he can hold on very tightly. He stands—as you've seen him no doubt—on the side of the trunk, and he

can run around it as fast as any other bird can run forward. So you see, he needs a good grip.



You'd hardly believe me if I said he had three legs, but he might as well have another leg, as the useful little tail he has. It is no straggling feathery affair, like a rooster's, or a peacock's. By no means! It is short and stiff, and when he is at work he props himself up with it, so that, as I said before, he might about as well have three legs.

When he wants his dinner, he flies from tree to tree, tapping away to find out if there are any little worms hidden away under the bark, or in any crack or hole. If he finds a hole, he runs his long slim tongue in, and as it is sticky at the end it brings out every unfortunate worm it touches. If they're too snugly hidden under the bark, the sharp little pickaxe chops off great pieces of bark, till he lays open the hiding place, and that's the last ever heard of the little worms.

One summer I was visiting in a very pleasant country house, where the roof was low, and came down nearly to my window. Every morning, just at the time when one wants to turn over and take another delicious nap, I used to be annoyed by a loud knocking. At first I thought it was at the door, and asked who was there, expecting to hear that breakfast was ready; but no one answered, and I found myself wide awake and much disgusted. After having the delightful nap spoiled several days, I became curious about it, and resolved to set a watch for the troublesome knocker, whoever he was.

After listening carefully, I thought the sound came in at the open window. Quietly and carefully I put my head out, looked up to the roof, and there I saw the saucy red head, and bright mocking eyes of a—woodpecker, looking over at me. He gave a sort of low chuckle to himself and flew away, and never again disturbed my morning nap.

These pretty birds have three enemies: a black snake who delights to crawl into the snug house in the tree, eat up the eggs, and live there himself; secondly, a ridiculous little dumpy wren, who'll steal into the comfortable house before the eggs are laid, and actually scold and fight the honest owners off, then lay her own eggs, and bring up her funny wren babies there; and, worst of all, I'm sorry to say, thoughtless boys, who like to steal away the pretty white eggs. Perhaps when they know how hard the poor little fellows have worked to make the home, they'll let them alone.

The woodpecker I've been telling about, is the common red

headed one, but he has cousins as interesting as himself. There's the Downy Woodpecker, who is slandered by the name of Sap Sucker, from a ridiculous notion that he taps holes in trees to suck the sap! Why, he don't care a snap for all the sap in the orchard; what he wants is caterpillars. The truth is, he is a very cunning trapper, and he sets his traps in this droll way. He selects a healthy tree, and picks a neat row of holes around the trunk. They are about a quarter of an inch in diameter, and half an inch apart.

He then leaves it, and the insects of the neighborhood who are always looking for just such cozy hiding places, come and lay their eggs there, and even sometimes spin cocoons in them. After a while, Mr. Downy Woodpecker comes back, and finds a fine feast all spread for him.

So instead of hurting the farmers' trees, the industrious little fellow is really destroying insects for them. And all the thanks he gets is the ugly name of Sap Sucker, and the ill will of all ignorant farmers.

Another of the family, the Golden Winged Woodpecker, is quite as interesting. He destroys great quantities of ants. He will sit down by the ant nest, and eat every unfortunate creature that comes out, till he has devoured the whole colony. He is just as faithful in destroying the boring insects, that do so much harm to fruit trees. He will tap the bark all around till he hits the right place, then throw his head back and drive his sharp pickaxe through the bark and snatch up the troublesome little fellows inside.

This pretty little bird has quite a time selecting his mate, or rather making himself so agreeable as to be selected by his lady love. Some naturalist has watched them, and he says that several of the Woodpeckers will surround one demure little lady. They will spread their tails, bow their heads, move around sideways, backwards and forwards, each one showing off his best to please her, in a very droll way. By-and-by she will signify which of her admirers she prefers, when all the rest will leave in the most polite way, making no trouble about it. After the nest is made, and the pretty little mother is sitting, he will come and alight on the tree near her, and say something that sounds like "flicker, flicker." Then she will shake herself out, and go off for a little rest, while he takes her place on the eggs. The enemy of this family is an owl.

I must tell you a little story about a great feat of one of these birds that lived near a lady who was very fond of them. Or rather I will let her tell it herself.

Here it is.

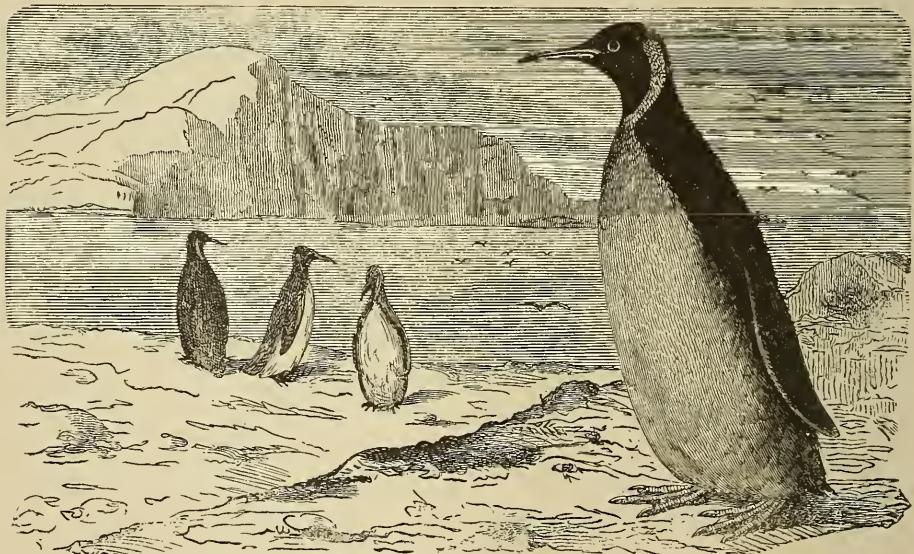
"A grand old oak, gnarled, twisted and partially decayed, stood near the house. A pair of these Woodpeckers were discovered trying to chisel a hole in it for resting purposes, and we lent our assistance to consummate matters. At the bottom of the cavity we sawed out a square block of a size to admit the hand, drove a nail partly into it for a handle, then replaced it carefully. In a day or two a lovely large white egg, with a translucent shell, pale hued by the yolk within, was laid in this cozy nest by the Woodpeckers. When the second one was deposited we gently withdrew the movable block and removed it. For forty-two successive days thereafter we repeated that sly piece of robbery, securing forty-two delicate, pearly eggs, laid in that same nest by that single Madame Woodpecker. At the end of that period she got sick of the business and departed. 'It was too bad,' tender hearts will murmur, who never think of commiserating the fowls in the barnyard whose nests are habitually rifled.

"We kept the eggs as the loveliest of ornaments, on a bed of pink cotton on the parlor mantel. At last they addled, and fell into the disagreeable habit of exploding like bomb-shells and scattering their *not* rose scented contents all about the room. Then they had to be thrown away."

*A BIRD WITHOUT WINGS.*

I don't mean that he has not something in the place for wings, but as far as any use of them is concerned, they are not wings, but paddles. When this curious fellow goes about on land, he walks upright—as you see in the picture, and when he goes in the water he can swim and dive with the greatest ease, using his wings to help him along.

This bird is the Penguin, and lives in the Southern Seas, spends most of his life in the water, eating cuttle and other fish. He is a sociable creature, always found in a crowd. On some of the islands in the South Pacific Ocean, the Penguins assemble by the thousands, some writers say thirty or forty thousand at a time. They look very droll when on shore, for they form themselves into ranks as regular as a party of soldiers—the fathers by themselves, and the mothers by themselves, and the young ones, also, all together.



Besides, their upright positions, and their white breasts and dark gray backs, make them look like human beings dressed in white, with black or dark cloaks. They are about three feet high.

The walk of the Penguin is not very graceful, being, in fact, a sort of a waddle; but it is said that if it is hurried, it will use its wings for fore feet, and run like a quadruped, and very rapidly too.

Mamma Penguin has a droll way of bringing up her babies. To begin with, she lays one egg of a grayish white color. It is hardly worth while to build a nest and sit on it for weeks, just for one egg, so this odd mother just takes it up—some writers say in a sort of a fold of her skin, and others say under her leg as though it was an arm—and carries it wherever she goes. She is not at all inconvenienced by this burden, for she can leap about, and roll from rock to rock without dropping it. It is well she can, for now I must tell you a very tyrannical and bad trick of Papa Penguin. If she is so unfortunate as to drop the egg, and thus destroy the hope of the family, this solemn looking personage, this wise father, actually beats his wife without mercy.

There is one good thing about him though, I must admit. He feeds her well while she is attending to this little domestic business. He goes out to sea and brings back many a nice fish for her to eat, and, in fact, she usually gets very fat at this time.

When at last the young Penguin comes to light and leaves his egg, both parents go out and fish for him. A droll little gray colored, woolly coated fellow he is, too. Then it is his turn to get fat, while papa and mamma both get thin.

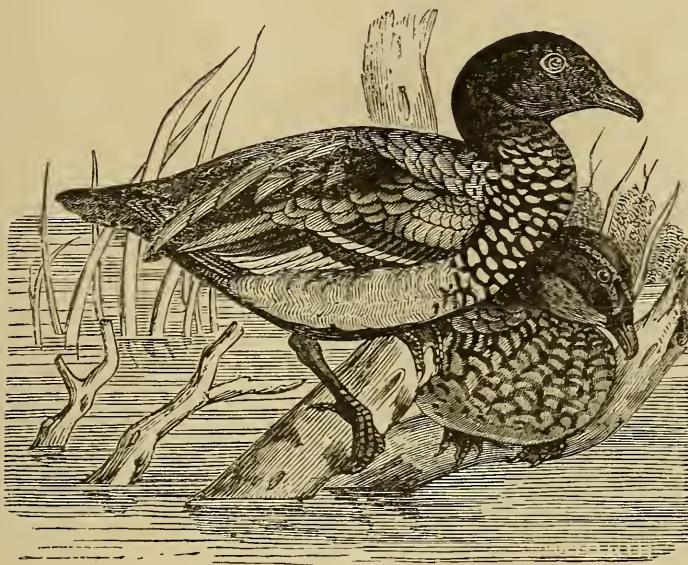
There is a comical account of the way in which this mother feeds her baby. When she comes in with the food, all nicely packed in her stomach, you know, she comes up on the shore, and the little one gets as near her as he can, all ready. She then begins making a very loud noise, something between a quacking and a braying, and after a little of this—which I suppose must be a small lecture on table manners—she puts her head down and opens her mouth very wide. Baby Penguin puts his bill into her throat, and in some mysterious way—not yet explained—he gets food. This goes on for ten minutes or so, first a talk and then a feed. And Papa Penguin does the very same way.

There are many kinds of Penguins, but their habits are very much alike. They are not afraid of man, and will fight with their strong beaks, when molested. They are very noisy creatures, making a sound like the braying of a donkey.

Their dress is more like down, or a sort of wool, than like feathers—a covering well suited to life in the water.



Here is a picture of a Penguin just taking a slight lunch. He don't stop to chew his food, you see, or to pick out bones, or even to kill it. He takes it fresh and whole, and head first—and that is the last of it.

*A SLANDERED BIRD.*

I would like to know—if anybody can tell me—why the Goose is always sneered at and abused. I think he is very dignified, and wise as any bird.

This picture is not the common domestic Goose, it is called the Bernacle Goose, and curious stories were believed of its origin in old times. It was thought to be produced from a Barnacle shell, and so strongly did people believe it, that they had pictures to show its various stages from a shell to a Goose. I think the people were the Geese that time—don't you?

But it isn't about this wild Goose that I want to tell you, nor about any of the many varieties of wild Geese. I want to tell you about the domestic Goose. It is a poor return for the long service of this bird that we should say "silly as a Goose." It has freely given its eggs, and even its very flesh for our tables, for I don't know how many hundred years, and yet we slander it. Not contented with baking, roasting, and stuffing him, not satisfied with stealing his feathers every year to stuff our pillows, and his quills

to write with and to make into ornaments—we have made his name a synonym for stupidity.

This is all wrong. He is not a coward. He is ready to fight even with a swan which is ever so much bigger than he is. In Russia they have trained Ganders to fight, as some people do cocks. Anybody—who has studied history—knows that the cackling of Geese saved Rome, for which the Romans are duly grateful, but the French hate Geese to this day for their interference in the plans of their ancestors.

The Romans feed their Geese intended for the table, with figs drenched with wine, and the despised birds long had the place of honor on royal tables. He's thought enough of as soon as his neck is wrung, you see, and roast Goose on Michaelmas day, is to this day, the thing in England.

Geese live to a great age—it is said as much as eighty or a hundred years—and when well treated, they become much attached to their owners. You have probably read the story of the Gander in Germany, which was in the habit of leading an old blind woman to church. He seized the hem of her dress and led her to her seat, and he retired to eat the grass about the door till she came out, when he led her home in the same way.

I have seen another story of an American Gander. The whole flock were stolen and could not be found. A few weeks afterwards the Gander appeared at the gate of his home screaming and refusing to come in. The owner—to pacify him—came out and followed him. He set off at once for an old barn, in which the owner found the rest of the flock. The Gander had crawled out through a hole in the floor, and went to his master to have the family released.

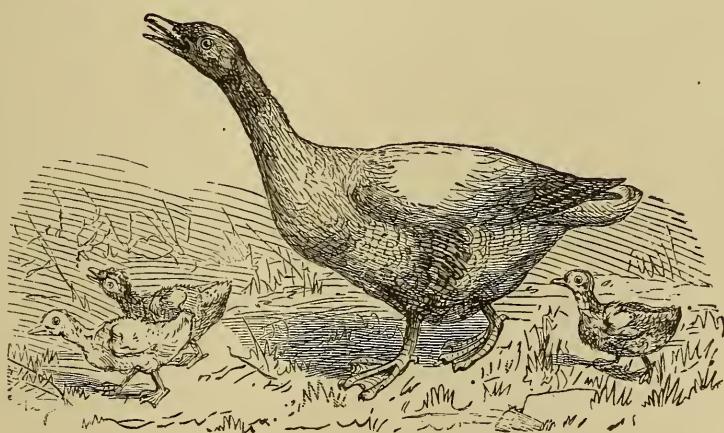
There's another instance of wisdom in the bird. The Geese in Richmond Park—in England—finding that the water rats disturbed their nests, made their nests in the trees after that, and when the little ones were hatched, they brought them to the ground one by one—*under their wings*.

In France, the skin of Geese is stripped off and prepared for clothing; with the down on, it is made into powder puffs.

But the Goose has had greater honor than that. Great honors have been paid to it among the natives of the East. The Buddhist monuments are often ornamented with the figure of a Goose, and the Ancient Britons thought it impious to eat the flesh of a Goose.

One of my neighbors has a flock of Geese, which wander over

the green near my house, and I have been amused to watch them. One thing I have found out about them, they never lose their dignity. No matter how ignominiously they come off from any contest, they always retire in good order, and with an air of wisdom that is very comical. One day I was sitting at my window watching them as they stalked about on the grass, when a frisky young cow put down her head and charged into the flock. Of course they scattered right and left in great haste, but hardly had she gone by, when their hurry was all over, and they subsided into a dignified walk, looking around as much as to ask "Who said they were frightened?" Then, in a moment, the whole family set up the most violent squalling and screaming, and they ran after that cow with their necks stretched out and mouths open, and with an air as though they would eat her. I could not but laugh; it was so much like some people, who, having escaped a danger by flight, brag and boast what they *would* have done, *if* something had been different. The Geese, by their manner, said "If you were not so big, Madam Cow, and we so small, and if you had not those sharp horns, while we have only our beaks, *we'd* show you!"



*LIVING SUNBEAMS.*

That's a good name for them, too, for surely nothing was ever created with the brilliant and flashing colors of these little beauties. Humming Birds men call them, and Murmurers they are called in some places. There are more than three hundred kinds of them already known, and new kinds are all the time being found, and they are exclusively American, being never found anywhere else, except in the Islands near the American coast.

Of course—if you've ever seen one of these beautiful birds—you know they are called hummers, because of the humming noise they make when poised over a flower. The different varieties make different sounds, so that one who has studied them, knows at once from the sound, which kind he hears. The humming is made by the rapid beating of the wings, for wonderful and beautiful as they are, these "Living Sunbeams" have no voice. Does that seem too bad? I think not. It would hardly be fair to lavish everything on one family—great beauty and sweet singing—would it? You will find on studying birds, that the sweet singers are nearly all of them clad in sober robes, and the great beauties can't sing a note.

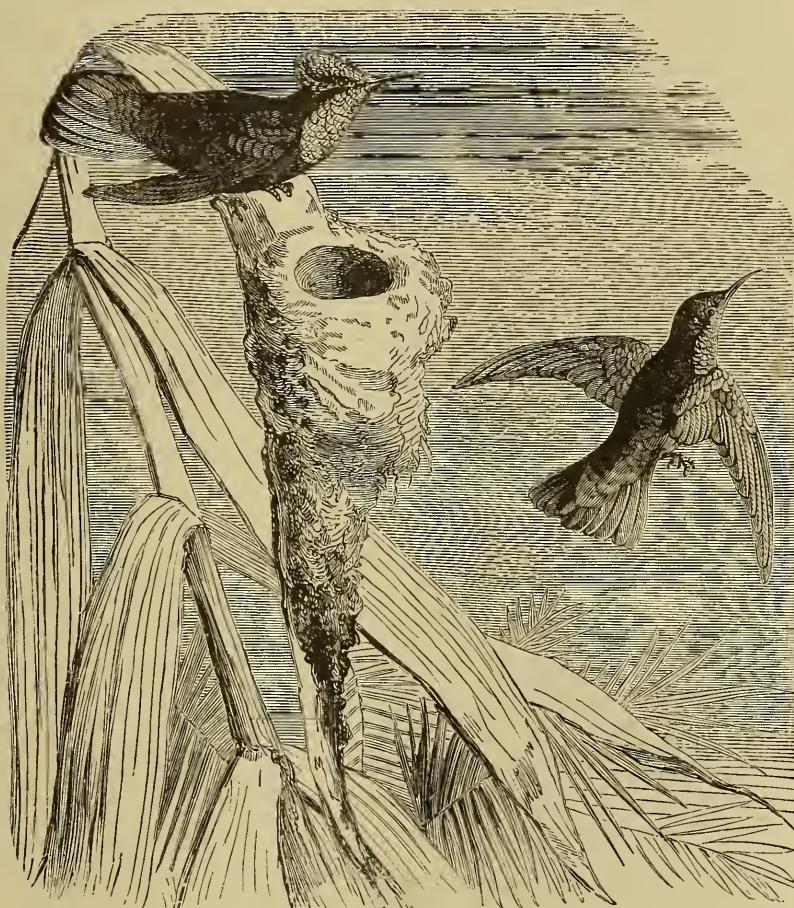
Humming Birds are made to fly. Even when eating they seldom alight, and their legs are very weak and delicate, while the wings are strong, which of itself, shows what they are made for.

They eat the honey from flowers, as has always been known; but it has been discovered of late that they are not satisfied with this delightful diet, but vary it now and then with a tender spider, or a dainty ant. They dart about so quickly that they have only to select what they will eat, for no spider or anything else can get out of their way. A little spider may sit in the middle of the web waiting for some unwary fly to come along, and in the very next second, before he knows what's the matter, he may be a prisoner in the stomach of a humming bird, his web left all stretched, with even the dew on it undisturbed.

Mr. Webber, a naturalist who studied these little creatures with great interest, and who caught and tamed a good many of

them, found that after a week or two they would droop, and seem about to die. Then he would let them out, and they would dart off for a few hours, always coming back, however. On watching them very closely he found that they spent the time in hunting spiders, and after one good meal of them, they were ready to return to honey diet for another two weeks.

The bill of the Humming Bird is a very curious thing. In each variety it is shaped to suit the flower on which it feeds. Thus some are long and straight, others are gently curved, and still



others curved almost into the shape of a sickle. Every kind, however, is pointed at the end. The tongue is stranger still—it is very

long, and double nearly to the base. It can be thrust out ever so far beyond the bill, and no drop of honey, and no tiny insect, however well hidden in a deep flower, can escape that tongue.

The nest of the Humming Bird is as wonderful as everything about him. It is generally made of soft and woolly substances, coated on the outside with bits of lichen or moss to make it look like the twig on which it is built. So well is it done, that it has often been mistaken for a small knot. Some of the family hang their cozy nests to the end of a leaf, as you see in the picture, and there they rock with every breeze, in their home not made bigger than a thimble.

Mamma Humming Bird lays two small white eggs, about the size of a bean, and in ten days the little ones are hatched. There's another thing about these dainty cup-like nests—the edges are all made to curve in, so that in a high wind the eggs can't be shaken out. Other nests are built on top of a twig, as you see in this next picture.



This nest, the upper one, looks as though made of leather and it is almost impossible to see it on the branch, it is so exactly of the same color. The owner of this cunning home is the Fiery Topaz Humming Bird, and his dress is of fiery scarlet, with bright green on the throat.

The other nest hanging to a leaf belongs to the Hermit Humming Bird. It is made of soft cottony substances from plants, bound together by spiders' web. Indeed spiders' webs



are very much used by all Humming Birds to bind their homes together.

I can't begin to tell you of the colors of these wonderful little beauties—all the most magnificent and brilliant colors you can imagine are fairly showered on them.

Some of them are called Sun Angels, others Coquettes, and such names as Ruby Headed, Sylph, Sparkling Tail, Wood Star, Crested, Sun Gem and Ruby Throat, are common among them.

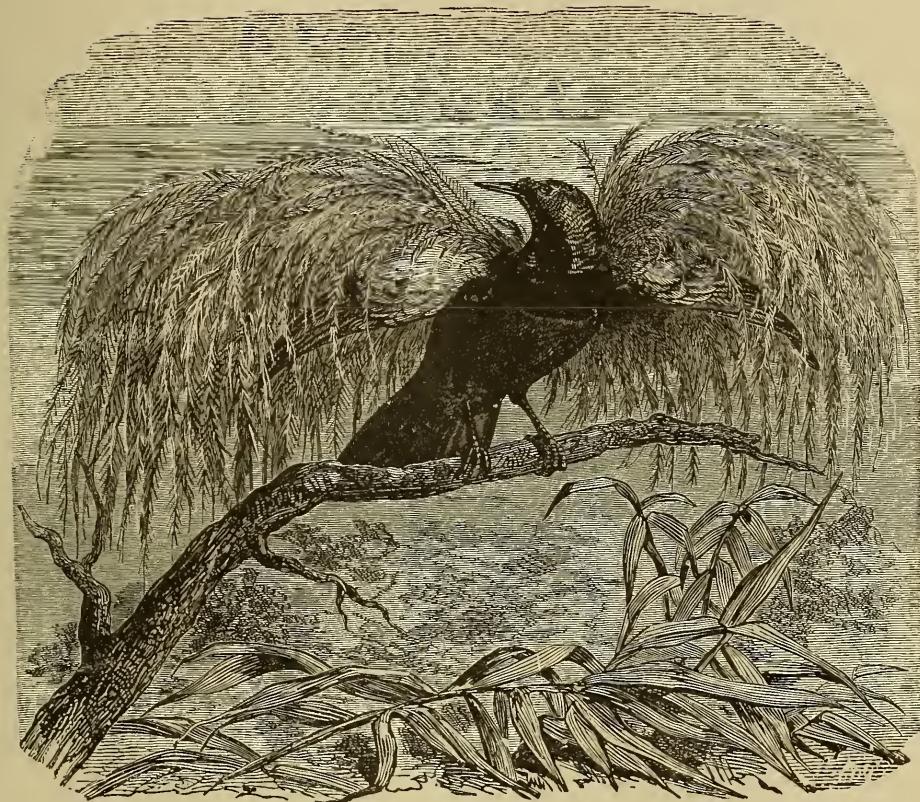
One of the most curious of them, is called Puff Legged, or White Booted, because of a singular ball of feathers on his legs, looking exactly like a down powder puff, or a tiny white muff.

All humming birds have ten feathers in the tail, but they are arranged in as many different ways as there are kinds. Some are sharp and stick out like thorns, and the owners are called Thorn Tails. Others have two feathers very long and drooping; these are four times as long as the bird. Another sort has the two longest feathers sticking out like two arms or the two sides of the letter V. Some are round and short, and stick pertly up on the bird, and others are forked like a swallow's tail. But in whatever way arranged, these ten feathers make a beautiful show. For beauty of color, the Humming Birds may be set down as the most gorgeous in the world.

I must now tell you about the tragedy going on in the picture on the preceding page.

The bird whose nest you see among the flowers, is one of the Hermit Humming Birds, and the murderer who has killed one of the owners of that quiet home, is the great crab spider—a dreadful creature, as large, when spread out, as a man's hand, I have read. This monster builds no house, and spins no web, but hides under leaves of trees, ready to pounce on small birds, or anything else he can find that he can master.

The night is his favorite time for hunting, and very properly, too, for such scenes are suitable to darkness.

*BIRDS OF PARADISE.*

I told you that no birds were more beautiful than the humming birds in colors, but in that family the feathers are close to the body, while the Birds of Paradise—as they are called—have the most wonderful plumage, added to the exquisite colors of the humming birds.

Very little has been known about them till lately, for they are only found in one or two places in the world. There are not many kinds either, but almost every one is very odd and striking in the arrangement of its feathers, and the feathers themselves are sometimes the most lovely plumes, and in others the strangest streamers.

Strange stories were told about these birds, by the savage

people among whom they are found, before our own naturalists hunted them out and studied their habits for themselves. It was said that they had no legs, but hung on to the perch by means of their long plumes, and that they made their nests and brought up their little ones in Paradise.

An old writer, in 1598, says that "No one has ever seen them alive because they live in the air, turning always towards the sun, and never lighting on the earth till they die, for they have neither feet nor wings." Even in 1760, Linnæus named the largest species the "Footless Paradise Bird," because the specimens brought to Europe never had feet, owing to a habit of the natives who caught them, of taking off the skin without the feet. It is known now, however, that they are like other birds in their habits, only so much more beautiful, that they keep their name, Birds of Paradise.

The picture at the head of this article is the Emerald Bird of Paradise, and is the largest variety known, being sixteen or eighteen inches from the tip of the beak to the end of the tail.

In color, the bird is a rich coffee color, with some green about the head. The two elegant tufts of plumes spring from the side of the bird, under the wings, and they are of a beautiful golden color. They can be spread out, as you see in the picture, or they can be laid back so as not to make so much of a show. They are sometimes as much as two feet long.

An English naturalist, who studied the habits of this beautiful bird, both in his native woods and in a cage, gives a very interesting account of him. He says that the creatures seem to know how lovely they are, and when a visitor comes near their cage, they will dance about in a graceful way, shake out their plumes, and seem to be pleased with the admiration they excite. They are extremely neat in their habits, bathing twice a day, and pluming themselves carefully, by drawing each feather through the bill, picking each feather, and often carefully looking on each side and all over themselves to see that not a speck of soil is on them.

They are so dainty that they very rarely alight on the ground, seeming to know that they would soil their elegant plumage.

They eat boiled rice and live insects, especially grasshoppers. They will not touch a dead insect. When a grasshopper is thrown to them, they will catch it in the bill, hold it down on the perch with one foot, pull off its legs and wings, and then devour it, head first.

These birds have a loud cry which sounds like "wok! wok!" They are very shy when in their native woods, and one needs to be very quiet to get near them at all. They have a curious habit of collecting together in great numbers on one large tree, and flying about from branch to branch, having a sort of a dance among themselves. The natives who hunt them, seek out such a gathering place, and putting up a sort of a roof of leaves and branches, they hide behind it, in some convenient fork of the tree, and wait for the dance to begin. They are provided with bow and arrows. The arrows are not sharp, but have a round flat end, so that the bird is killed by the blow, and no blood gets on his feathers.

When the birds have commenced their play, the hunter shoots one after another, and a boy on the ground picks them up as they fall. The other birds do not notice the falling of their friends, and often a hunter will get several beautiful birds in one morning.

To prepare them for market, the native cuts off the wings and feet, skins the body, and runs a stick through the skin. The whole is wrapped in a palm leaf and dried. They are often very clean and nice, but the practice of cutting off their wings and legs is what gave rise to the absurd stories about the bird.

These birds, when alive, have sometimes sold for as much as two or three hundred dollars apiece, and they have lived in London sometimes as long as two years.

This is another of the family, called the Superb Bird of Paradise, and if you could see him with that elegant tuft of feathers now lying on his back, raised behind his head like another magnificent pair of wings, and the beautiful tufts which hang down, as though he had on an apron — with their wonderful glossy green color — you would admit that his name is very suitable.



His general color is the deepest, richest violet, almost black, tinged with green. This bird, not being so readily sold as the Emerald, is not much hunted, and its habits not so well known.

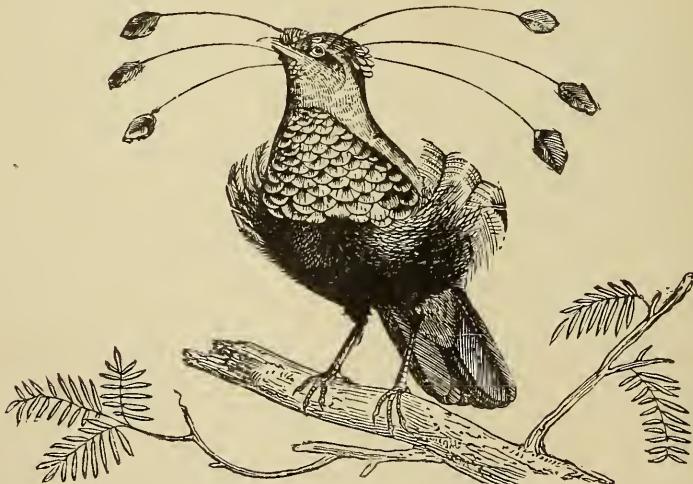
Here is another, the King Bird of Paradise. He is a little fellow, about the size of a sparrow, but he is a great beauty.

In color, the back is rich chestnut, and the breast white with a band of golden green across. His oddest feature is the fan-shaped tuft of feathers which springs from each side, of a sort of gray color tipped with bright green, and which the pretty little fellow can spread out, or lay flat down as he likes.

The two middle feathers of the tail are curious also; they are very long, and like small wires for about five inches beyond the rest of the tail, and at the ends of each, a beautiful tip of bright green in a spiral form.

This little beauty lives on low trees, and eats a hard fruit. The natives of the Malay Islands where it lives, call it by the graceful name of "Goby-goby."

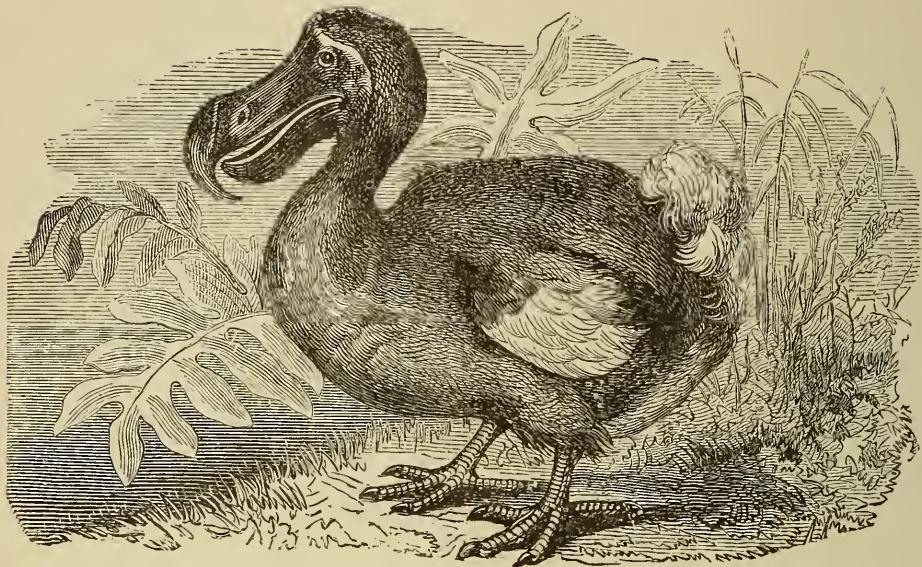
The last picture that I shall show you, is the Golden Bird of Paradise. Here it is.



You see he's not a whit behind the rest of the family in beauty, and his six head ornaments make him very curious besides. His

color is a beautiful velvety black, with throat and breast of rich gold color. He has also his fan-like plumes on the side, something like the King Bird. But the six long wire-like feathers, with their bits of feathers at the end, are not known to exist on any other bird. They can be lifted up, as in the picture, or drooped over his back, as he likes. Very little is known about his habits.

There are several other kinds of Birds of Paradise, perhaps as strange and beautiful as these.



### SOME DROLL BIRDS.

Look at this picture well, for you'll never see a living bird like it. It belongs to the extinct races—which means that there are no more to be found. I'm sure it's no great loss to the world, for such a dumpy, fat, awkward creature seems like a monstrosity after reading about humming birds and birds of paradise.

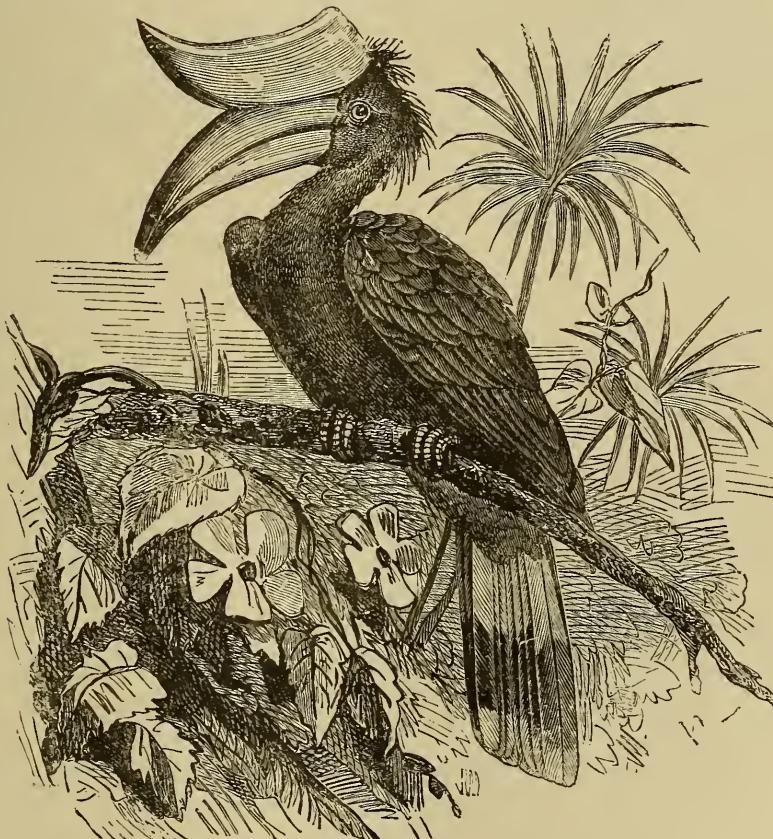
The great interest felt by the scientific world in this bird is caused by the fact that there are none to be found alive now—as I said, and of course we must have his portrait among our droll birds.

He was—when alive—a native of the Mauritius Islands, and he was in the habit of weighing from forty to fifty pounds. He was a slow, stupid sort of a fellow, and would stand still to be knocked down by a stick. Probably that's the reason he's extinct, by the way, for of course everybody would delight to knock down such an accommodating fellow.

Now, who would think he belonged to the pigeon family? no one but a naturalist, I'm sure. But of course they know, because they do not judge by the outside—they go clear through to the

bones before they decide. They say he is a pigeon—and a pigeon he shall be. One old writer in describing the Dodo, says, "He is, for bigness of size, between an ostrich and turkey, from which it partly differs in shape and partly agrees with them, especially with African ostriches."

His body was fat and round, and covered with soft gray feathers. He had no wings—to speak of—and only a few small feathers for a tail. His legs were short and yellow, and his head—well, you can see for yourself that his head was not very pretty or graceful. He was a very greedy bird—I'm sorry to say—but he met the fate he deserved by being eaten by men, at such a rate that he became extinct.



Here's another droll bird about as graceful as the dodo—but not yet driven out of the world. It is the Rhinoceros Hornbill.

Pretty little bill he carries, is it not? I'm happy to tell you

that it isn't as great a burden to the bird as it looks, for it is very light. You wouldn't think it was any burden if you could see him flying about, and hopping from branch to branch, as he is fond of doing.

His voice is not particularly musical, being in fact a sort of roar, interspersed with a snapping of his bill together, as if he wanted to bite some one's head off. In truth he has the credit of having seriously frightened travelers in his native woods.

What has he such a bill for? Well—the wise men haven't quite decided, but it is supposed to be for the purpose of killing his prey, for this bird eats not only fruits and vegetable matter, but small quadrupeds and birds. The length of this curious fellow is about ten inches, and his dress is a modest suit of black and gray.

But now I must tell you of a very singular performance in the Hornbill family when the nest is made and the baby Hornbills are hatched out. The nest is made in a hollow tree, and when all is ready, and Mamma Hornbill has laid her one egg, she meekly takes her place over it, and Papa Hornbill coolly proceeds to plaster up the door with mud! Then she is a prisoner, with only opening enough to stick out her bill, and there she stays, not only till the baby comes out of the shell, but till it has got its feathers and is ready to fly. Meantime her jailor feeds her every day, and she gets very fat, it is said.

Why he should do this nobody knows, whether to keep out enemies, or to keep the mother at her work; but we do know that he does it.

It is said that in India this bird is domesticated, because of his fondness for rats and mice, which he kills in great quantities.

Here's another curious bill, not quite so large as the hornbills, but about as odd. It is the Spoonbill.

This personage carries a bill shaped like a spoon—as you see—and about eight inches long. As you might guess from the length of his legs, he is a wader, and gets his dinner by fishing about in the mud of streams with that convenient bill of his, and digging out the reptiles and small fish, and such creatures that delight in mud. He is also fond of visiting the seashore, and adding to his bill of fare, crabs, shrimps, and other sea food.

He dresses in white, with a faint tinge of pink. His eyes are red and his legs and feet are black. His bill is yellow and black, and his length is about thirty-two inches.



In some countries the curious spoon is considered valuable. It is taken off, scraped thin and polished, and set in silver, and used as a spoon.

While we are looking at curious bills, here is another, the Cockatoo.

He is a native of Australia, and has the honor of naming himself. His cry sounds like cock-a-too. He belongs to the parrot family, and can be taught to talk, though not very well. His bill, you see, is a short crooked object with a sharp cutting edge.

There are several kinds of Cockatoos; that in the picture is the Sulphur Crested, and is common in Australia. It is dressed in white; with a bright yellow crest. The bills of these pretty birds are so hard that they delight in biting with them, breaking nuts and such things, and they are very useful in climbing about.

The fan-like crest which he wears, is his great beauty. He can raise it or lower it as he pleases, and it makes a great change in his appearance. The White Cockatoo, and also the Sulphur Crested, is greatly prized as a pet. He can be taught to say a good many words, after the manner of parrots, and he is very amusing to watch, for he expects admiration, and shows it very plainly.



Cockatoos are always covered with a white powdery substance that comes off in your hand if you touch them. The use of it is not known. In their native country they are not very much liked, especially by farmers, for they are terrible destroyers of crops, grains and seeds being their favorite food. In the London Zoological Gardens they are fed on boiled rice.

Here is another droll bird, not for his bill however, but for his tremendous tail, which he seems to admire in the picture. Who would think he belonged to the same family as the common wren! This very elegant creature, the Lyre Bird, is a native of New South Wales, and his splendid tail is often as much as ten feet long. He lives in the bushes, and is extremely shy, and hard to find. The hunter has to crawl and creep among the brush, while the bird is singing, for the least crack of a twig will send him off like a shot. He is curious though, and a whistle or other peculiar sound will excite his curiosity. He will fly up to the nearest branch of a tree, and look around for the cause. He never tries to escape from danger by flying, but relies on his legs, and he can run faster than anything or anybody.

He can leap, too, sometimes as much as ten feet directly up in the air.

Sometimes he is hunted by dogs. When he hears the bark, he leaps or flies to the nearest tree, and stops to look about. While thus engaged the hunter can generally get near enough to shoot.



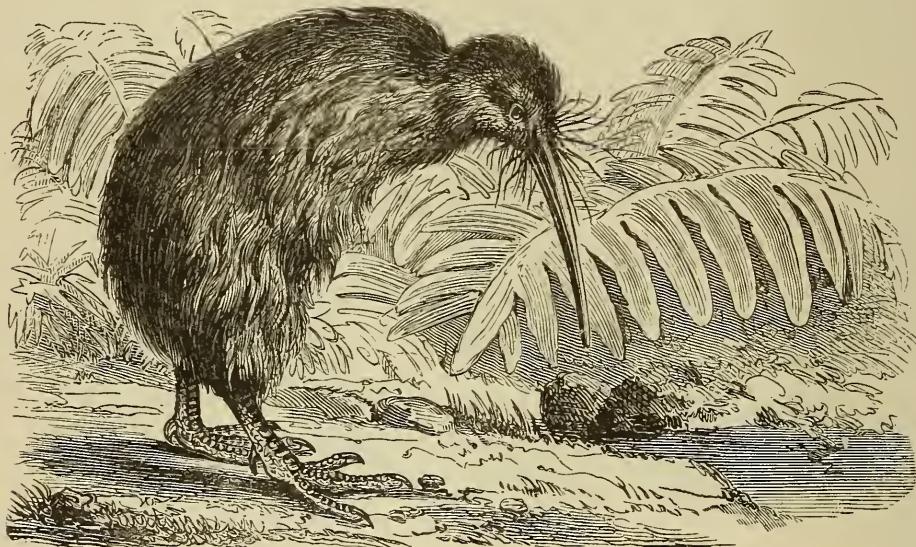
Another way of hunting him is to put the tail of a Lyre Bird on the hat of the hunter, keeping it in motion, and concealing the body of the man behind the bushes. Of course he isn't afraid of his own kind, and so the sportsman, under cover of these false colors, can get near him.

Hunting him is no play either, for he frequents the most inaccessible rocks and gulleys, where men can hardly go. He eats insects, especially centipedes and such things. He sings very well, and is fond of imitating other birds' noises.

The Lyre Bird's nest is as curious as anything about him. It is built of sticks and roots and leaves, and has a roof of the same material. It is loosely built, and looks rough outside, but inside it is lined with soft down and feathers.

The egg is about the size of a hen's egg, and of a deep chocolate color spotted with purple. I read of a nest which was taken with a young bird in. The young one was about sixteen inches high, and was not frightened, but would follow anyone who imitated the call of the mother. They fed it with worms and ants, but it died in a few days.

This bird usually carries its long tail up—as in the picture—though perhaps not quite so much spread out. He even flies or leaps into trees with it so, but when running away from his enemies he holds it out straight behind.



Here is the drollest of all. A bird without wings or tail' whose very name—*Apteryx*—means wingless. How wise he looks bending over the water, with that long pointed bill hanging down.

This curious fellow lives in New Zealand, but you might live there all your days and never see one, because he only comes out at night. Perhaps it is because he feels himself to be a curiosity, and don't like to be stared at.

During the day he hides among the rocks, or tree roots, or some other snug place, and at night he comes out and prowls around after his food. He digs about in the dirt and mud with that handy long bill, and eats worms and insects. He is said to attract worms to the surface by jumping on the ground, and stamping with his feet, for perhaps you know, worms are curious little fellows, and any sharp jar of that kind will bring them to the door to see what is the matter.

The feathers of the Apteryx are odd too; part of the way down they are like down, and the rest of the way more like hair. The skin is very tough and valuable for making the mantles of the chiefs of that country. No common person is allowed to wear them. They call the bird Kiwi-Kiwi, and they hunt it at night, with torches and spears. It is a good runner, throwing back the head and getting over the ground at a great rate of speed.

He wears a suit of chestnut brown, and he grows to be two feet high.

Mr. Wood tells of one that is kept in the London Zoological Gardens. During the day it hides behind the straw in its cage, and can only be brought out by force. It will not stay a minute, if it can help it, but will run back and hide. In the same place are shown some of the eggs of the Apteryx. They are about one-fourth of the weight of the mother bird, which of course, is very large for eggs.

It is said that this bird is very much attached to its mate. The one that is kept in London is fed with worms, which are bought by the thousand; it will eat more than a quart a day. It has a habit when tired of leaning on its bill like a cane, and droll enough it looks in that position, like a little old man with a feather coat on.

I said he was wingless. He has some sort of a stump in the place of a wing—which some writers say is armed with a hooked claw—but nothing that he can use as wings, and he never makes the least attempt to fly.

*THE LITTLE WORM HUNTERS OF NEW YORK.*

Pretty little fellows they are, with their neat brown coats and sharp black eyes. What do they hunt worms for? why to eat, of course, and to feed their babies with, and very nice and fat they get too, on that curious diet.

But stop—I'll tell you the whole story of how they came to live in New York, for they are emigrants—like the rest of us—and came over in a steamship. Several years ago a colony of worms, or caterpillars, came to the city and settled in the trees of New York and Brooklyn, having a nice time, and eating the leaves, with no one to molest them.

Nobody knew where they came from, and at first the people did not think much about them, though they had a disagreeable way of spinning a thread and dropping down on passers-by. But as the years went on, and the colony increased, it got to be an intolerable nuisance. Ladies could not go out without being covered with worms, nor step without crushing one. The poor trees were nearly eaten up, and half dead, and at last people had to carry umbrellas, and cut down the prettiest trees, which were favorites with this disagreeable colony.

After awhile the newspapers began to talk about it, and finally it was discovered—by some naturalist, I dare say—that there was a little fellow living in England, who just delighted in these very worms, as you do in candies, and who would eat nothing else so long as he could find one of them. So the whole big city began to cry out for this little foreigner, and at last somebody was sent over to England to induce a part of the family to emigrate.

By means of boys with snares, and in other ways, quite a large family—many hundreds—of the little worm hunters was collected, provided with suitable traveling accommodations, and started for New York.

In the meantime, the people of that worm-eaten city prepared to welcome the strangers, by putting up hundreds of houses for them, for they don't stop at hotels like other foreigners; they must have their own homes before they can feel contented to stay. The houses were of all kinds—from the rustic, bark-covered cottage

fastened up in the fork of a tree, to the gorgeous white villa, trimmed with green, and elevated on a stout post in a back-yard.

They put these houses up high, because these little fellows don't need front steps to get in and out, and they have some enemies that do, such as cats and bad boys.

I can't begin to tell you how many kinds of houses there were, but anyway, they were all ready when the strangers arrived and were let loose in the city to find homes for themselves. Of course they found the snug houses at once, and bushels of food every way they turned, so they settled themselves without further trouble, furnished the houses—principally with bedding—and began to raise their families.

Everybody was delighted, unless it was the worm family. I don't suppose they liked it very well, because they didn't have so easy a time as before. If Mamma Worm showed her green head out of doors she was apt to be snapped up in a hard little bill, and stuffed down the throat of a hungry little baby, and naturally, she didn't enjoy it.

But their good time was past. Their lively little enemies soon had big families of hungry children, and the children grew up and were able to hunt for themselves, and then they raised families for themselves. And when the weather grew cold, and the worm family were all snugly asleep in their cozy little hid-away houses, the people scattered food out of the doors and windows for the Sparrow family, (I don't need to tell you New York children their name,) so that they would not get hungry and home-sick, and go away. And when Spring came, and the worm family came out as good as new, prepared to have a nice time, as their forefathers had done, there were their enemies all ready for them. They were snapped up and disposed of by the hundreds, and thousands, and millions. Mr. and Mrs. Sparrow had very little trouble about their marketing, I can tell you. All they had to do was to hop around in their own tree, and help themselves.

But after a few years of this sort of thing, the worms got discouraged—or else eaten up—and there wasn't one to be seen. But the Sparrows grew thicker and tamer, for no one was allowed to kill one. And the trees came out beautiful and green as of old, and the whole big city feels very grateful to the pretty little worm hunters from England.

Now the whole city is full of them. They fly about the streets,

among the omnibusses and wagons of Broadway, picking up food from under the feet of the horses, coming down in the depots and ferry-houses, to hunt up any stray bit of something to eat, and visiting every door-step and back-yard for crumbs.

They don't care a bit for the country and the woods, not they; they are sociable little fellows, and like to live among men, and all they ask is a retired home in some city tree, and plenty of food for their babies. Oh yes! and a morning bath, and I must tell you what a gentleman saw one Sunday morning in the City Hall Park.

He had to go through there quite early in the morning, and he saw hundreds of the funny little Sparrow family at their bath. That fountain seemed to be one of their regular watering places, and was as busy and bustling as Newport or Long Branch. The basin was full of water, and the edge was just packed with the little bathers, dipping their heads in, fluttering and spattering, and dashing the water over themselves and their neighbors, and having a splendid time generally.

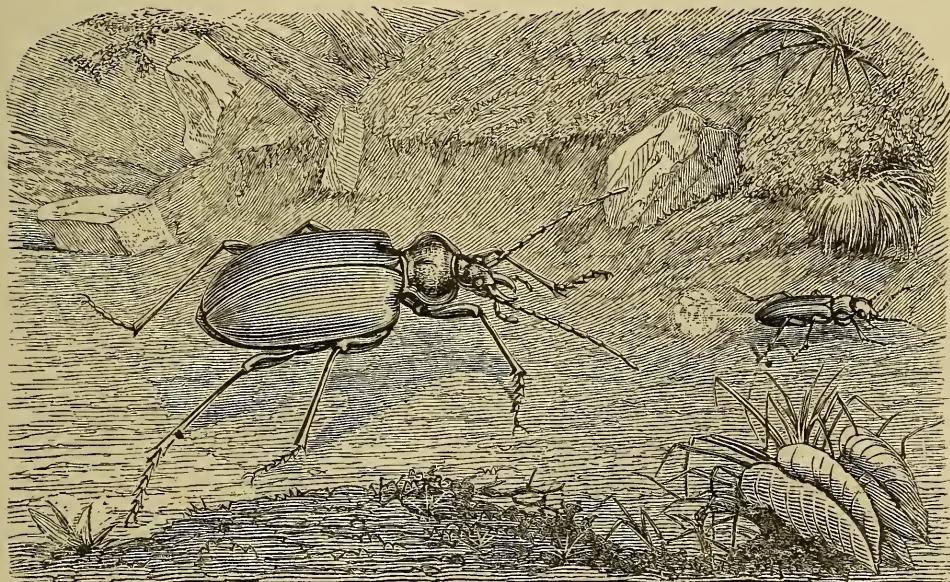
The gentleman was so much interested in the comical scene that he stood and watched them for some time; and I daresay you can see it yourself any time—if you'll only go early enough.

### LITTLE WARRIORS.

Perhaps you think such tiny creatures as insects are very helpless, and you would laugh at the idea that one of them could shoot guns at you.

But you needn't laugh, for it is true. And a funny little fellow he is, too. He is a Beetle, and is called—from his shooting propensities—the *Bombardier Beetle*.

And here is a picture of him.



Though he makes a loud explosion, and a blue smoke, exactly like a tiny gun, he doesn't send out balls, or even shot, but a bad-smelling fluid, that causes a burning feeling where it hits and undoubtedly is very severe to his small enemies. At any rate it drives them away.

Most of these little creatures have weapons to defend themselves against their insect enemies, and some have weapons strong enough to protect them from boys and even men.

The wasp and hornet are perfectly safe, with their powerful stings, you know. And one little tiny creature, has a sting that will make a man lose his senses in five minutes, and make him so ill as nearly to kill him.

Would you like to see an insect that carries a double whip, and lashes it furiously around to keep off flies and other troublesome creatures? You have only to catch a puss-moth (no relation to your pussy cat), and you'll see the little whipper.

It is really wonderful what brave little warriors these tiny atoms are.

A bee, or even an ant, will not hesitate to attack an elephant if he thinks his rights are trampled upon. And, by the way, an army of ants can kill large animals, even men, if their hands are tied so they can't defend themselves.

The little warriors in the spider family are very spirited. They will show fight in an instant if a man interferes with their comfort.

Not all these little creatures are fighters, however; there are several other ways of protecting themselves. One way is that taken by children who have done something naughty, and don't want to be found out—to hide. Some of these hiders cover themselves with mud or sand, and when they keep still they look like tiny lumps of dirt. But the oddest of the hiding sort, is one that sometimes gets into houses.

If you want to know his name, it is *Reduvius Personatus*, and he isn't half an inch long either. Aren't you glad your name isn't three times as long as you are?

But I didn't tell you how he hides. He covers himself with dust of rooms, particles of carpet wool, and tiny threads of cotton and silk, till he looks like a walking dust heap, or an awful ugly spider; but if he keeps still you can scarcely see him.

Another, a tiny fly, with a long name, which I know you'll never remember, so I'll leave it in the grown-up books, hides himself under a high pile of the skins and down of the smaller insects he eats. As if you should cover yourself with sheep-skins after eating mutton. If you take off this odd coat, and put him under a glass, or where he can't get insects to kill, he'll dress himself in

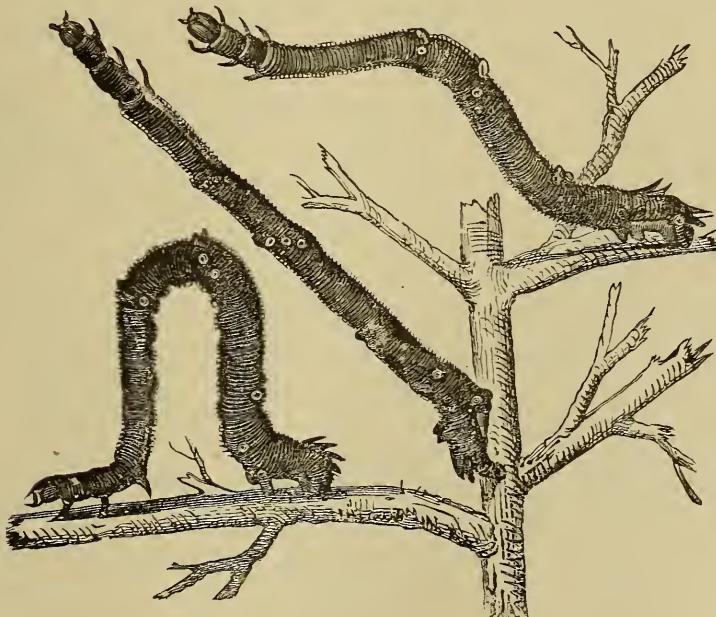
the first thing that presents, either silk or paper. He isn't particular, if it's only a good thick coat.

You know how men will run away from a helpless little animal no bigger than your kitten, called a skunk, because of an unpleasant fashion he has of emptying perfume bags on them. Well, very little insects also have scent bags probably quite as offensive to their enemies. Some beautiful lace-winged flies smell so horribly that even naturalists, who handle ugly big spiders every day, hate to touch them.

There are a great many insects who are not warriors, and who don't hide, and have no scent bags to shoot at one. Don't think they are defenseless, however, the very tiniest of them has some way to take care of himself.

Many protect themselves by taking some peculiar position that makes them look like a stick or stone.

One Caterpillar, who lives on trees, if disturbed, will hold on with his two hind legs, and stick up the rest of his body in such a



way that he looks exactly like a little twig. Here is a picture of him. One gardener that I read of, attempted to pick off what he thought was a dead twig, but his Caterpillarship having no desire to

be picked off, came to life in the gardener's hand, and frightened him so that he dropped it in horror.

One little Beetle will stiffen out as if dead, his legs as stiff as iron wire. He thus escapes being eaten by a bird, who don't eat dead things. These little fellows, who pretend to be dead, or "play 'possum," will keep up the play till the last breath. They may be torn to pieces, limb by limb, or burned by a slow fire, but not a sign or a quiver will they give. Poor little things! they seem to know that it is their only hope of escape.

One little creature, when frightened, rolls himself into a ball. He happens to make a very pretty ball, for he is black and shiny, and has white stripes.

I read a story of a girl who was once walking in a garden when she chanced to disturb a family of this sort. Of course they all became balls at once. The girl noticed them, and supposing they were beads of an unusually pretty kind, she gathered a handful of them, carried them home and proceeded to string them. Naturally they objected to being strung, and turned to life again in her hands. Probably she screamed and dropped them all on the floor; at any rate she never strung any live beads again.

Some of these rolling up creatures look like little stones, and others like the black seeds of flowers. Caterpillars which roll up look like funny little hair balls, and it is almost impossible to take them up, they slip through the fingers so easily.

The very oddest insects that I ever heard of, are those that are dressed in disguise all their lives. One who lives in the black dirt with patches of white sand in it, is himself black and white, just the color of his home, and can scarcely be seen in it.

One of the specter family looks so much like a little stick that you would never believe him to be alive unless you saw him run.

His picture is on the opposite page.

He is long and thin, exactly like a twig, and his six legs are like smaller twigs. His head looks like a kind of bud in the end, and his tail—well, his tail looks so much like his head that I could never tell which was which. He is such an odd-looking object that one hates to touch him, and I saw a gentleman try to catch one with a pair of scissors. Instead of catching him, alas! he cut him quite in two. Before we recovered from our horror, he ran away, the head end one way and the tail end the other way. I should, there-

fore, consider that he had two heads and no tail, but the wise men,



who know more about it, say he has but one. This creature has funny names in different places. We used to call him Knitting Needles. In Brazil he is called the Devil's Horse, and by some

others the Walking Stick. Being so light and having such long legs, he can run like the wind, and you'll have to be lively if you catch him.

Another family who dress in disguise are called *Mantidæ*. They imitate dry leaves, and look so exactly like them, that even when they move one can hardly believe they are not dry leaves rustling along in the breeze. It looks funny enough to see a little leaf walk off. Some look like rose-colored flowers, and others like small red fruit.

Mr. Gosse tells of a naturalist who saw at his feet some withered leaves, whose tints pleased his eye, and he attempted to take them up. But to his amazement, they all took to their legs and ran away. He caught one and found it to be an insect.

The same gentleman tells about the tricks of a pretty little West India fish which the negroes call the Sand Gootoo, because it hides in the sand. He tried to catch one with a net. He threw it down over one which was beginning to hide himself in the sand. He felt sure he had it, but he could not find it with his hand. Soon he saw creeping from the net an object that looked exactly like a hen's egg. The boy seized it, saying it was the fish. He held it up, and Mr. Gosse saw that it was swelled out like a blown bladder. He put it in a bottle, when as soon as it touched sea water it came back to its natural look.

Wasn't that a funny way to hide?

*NURSERIES FOR BABY INSECTS.*

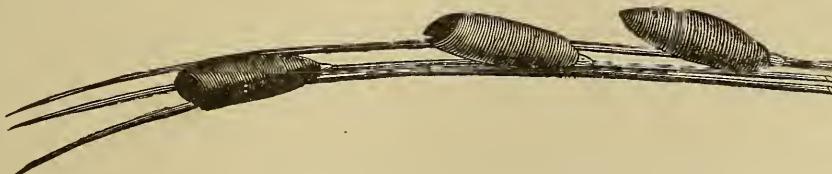
You have seen how carefully a hen feeds and cuddles her chickens, and perhaps you have been so happy as to see birds feed their nestful of little ones; but did you ever see ants and bees feed their babies?

You don't believe they do? That's only because you don't know anything about it. I can tell you that little insects, not so big as a grain of wheat, take as good care of their little ones as the fussy old hen; though they don't make so much noise about it. And, as they're afraid of you, they take good care to hide their babies away, and run—or fly—the minute they see you coming.

In the first place, most of these little mothers die before their babies come out of the egg; so they have to build the nursery, and prepare food for the baby, while it is still a tiny, tiny egg—often so little you can scarcely see it.

Perhaps you know that the baby of a butterfly, or insect, is not made in the least like its mother, at first, but is a small worm or grub. Of course, it can't eat such food as its mother does; but the wise little mother knows just what it will like to eat, and works hard to lay up a good stock of food, as well as to get a roof over her baby. Some of the little mothers, however, don't care for a roof, and they merely hunt out the proper plant, that the grub will like, and glue the eggs to the leaf.

One kind of insect longs to put her babies safe into the warm stomach of a horse. A funny nursery, you think; but just the one for the Gadfly baby. So she glues each egg to a hair of the horse;



and she's very careful to fix it where he'll be sure to lick it off, on his shoulder or knee. When he takes them off with his tongue, they get into his mouth, and so they go down to his stomach. What a marvelous care for the little one is that!

Here is a picture of the Gadfly babies in their egg cradles, all fixed to the horse's hairs.

There's one family of insects, I'm sorry to say, who get comfortable homes, and food for their babies, by stealing into nests that honest mothers have built. When the grubs are all hatched out, the little thief eats up all the rest.

Did you ever see a Sand Wasp? She is a very hard-working mother. She digs a hole in the hard sand, and actually drags to it a big caterpillar or spider, ever so much bigger than she is, which she has bitten in such a way that it is helpless. When she has it safely in the nest she lays her eggs on it, and then covers it up with dirt. When the grub comes out of the egg, there is a feast all ready for it.

Another of this Wasp family, the Mason Wasp, having prepared her nursery, gathers about a dozen small grubs or worms, and packs them in alive, for food for the baby. Perhaps you think that the grubs would eat up the egg; but the careful little mother looks out for that, and packs the grubs in coils, or rings, so tightly that they can't move.

If I had to be packed away in a cradle, to grow by myself, I'd rather have the bee mother do it. She provides no grubs or caterpillars for food, but delicious honey, which I should like better.

One of the coziest nurseries arranged by these little mothers is in a nut. She makes a hole in a green nut, hickory or chestnut, and packs the egg in, snug and warm. The grub hatches out and just feeds on the sweet nut, till you crack it open some day, and he crawls out. If the nut had been left to fall from the tree, he would have crept out and buried himself in the ground, till his wings grew.

But not all the little mothers die so soon as these. Some can take care of their babies themselves.

Some of the Wasps not only give the baby a caterpillar to begin on, but every day or two they take a fresh one and put it in the nursery, till the baby is grown.

Another little mother, the Saw Fly, sits on the leaf where her eggs are, till they are hatched. Then she feeds them, and shelters them from the sun with her wings, for five or six weeks, till they are grown up.

But the most attentive insect mother, is a Beetle. She leads her troop of babies around, as a hen leads her chickens, and

she has thirty or forty of them, too. But they are better behaved than chickens, and they keep close to their mother.

I'm afraid you think of Spiders as cruel, fierce creatures, because you feel sorry for the buzzing flies they catch in their webs. But I hope you'll think better of them, when I tell you that they are most affectionate mothers, and will allow themselves to be torn to pieces before they will abandon their babies.

One Spider mother carries her eggs around in a white silk bag, as large as a pea. She never lays it down, and she will fight for it as long as she has life. When they are hatched, they are tiny mites of Spiders, not grubs, and they hang around their mother, climb on her back in crowds, cling to her long legs, even get on her head. She carries them about wherever she goes. Funny enough she looks, too. Why, she's worse off than the unfortunate old woman who lived in a shoe.

What would you think of thimble-shaped cradles for a Bee baby? One little mother makes them in that shape. First she digs a place in dry ground, then makes one thimble, fills it with honey and pollen from the flowers, and puts one egg on it. Then she fits another thimble into that, just as you would slip one thimble into another, only they don't go in very far. The second one stops up the door of the first; so she goes on till she has half a dozen or so, and then she fills the hole with dirt.

Another very careful and thoughtful little mother Bee wraps her babies in flannel, to keep them warm. She gets her flannel, or what looks like flannel, from the leaves of some trees, which are woolly. The wise men call her the Clothier Bee.

If you think that's a funny name, what do you think of Carpenter Bee, and Mason Bee? The carpenter cuts her baby house out of wood; and the mason builds hers with bricks, which she makes by gluing together grains of sand.

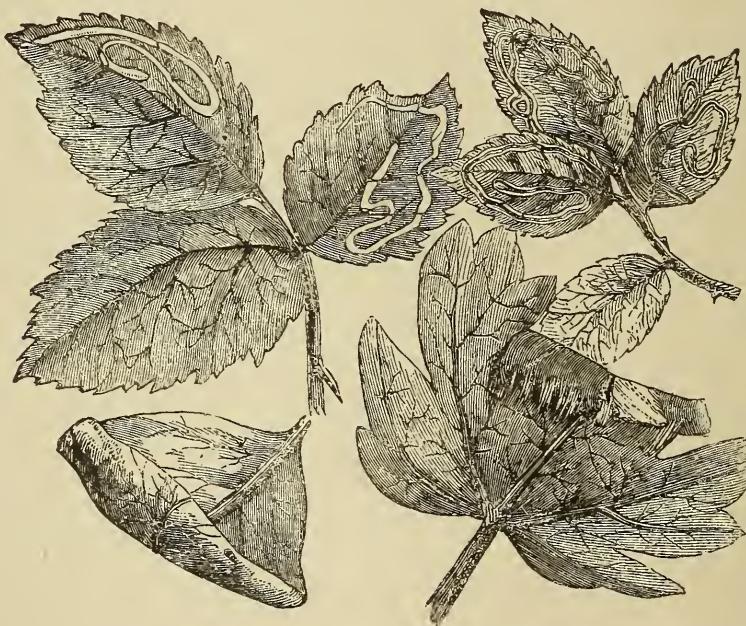
The gayest of all, however, is the nursery of the Upholster Bee. This neat little mother first makes a suitable hole in the ground, and carefully smooths the walls. Then she flies to some poppy, or rose bush, and selecting the brightest blossoms she can find, always scarlet, she cuts out little round pieces of the gay flower, and with them completely lines her nursery. She puts two or three thicknesses, to make it warm.

I think this Bee baby must belong to the royal family, with its dainty scarlet hangings, and delicate food of honey.

Don't think that the bees and wasps make all the cunning nurseries. There is a little Beetle mother, who makes a pretty green tent for her baby. She makes it of a leaf, which she leaves hanging to the tree, so that every breeze will rock the cradle. And that baby eats its own tent up.

How do you suppose a little Beetle would go to work to roll up a leaf ever so much larger than itself? It is a wonderful operation, and I'll tell you how it is. First, she gnaws through the thick veins of the leaf in a good many places, so that it will be easy to roll. Then she fastens a row of threads, which she spins from her own body, from one side to the other.

These threads, which are really ropes to her, she tightens, one by one, by pulling them with her feet. As she draws one a little nearer, she spins a shorter rope to hold it there. So she goes on shortening them more and more, till she draws it completely over, where she wants it. You can see two of these leafy tents in the picture.



Men, with all their wisdom, could find no better way to do that job, than the humble little Beetle takes.

If you ever notice leaves, and I hope you do, for they're exquisitely beautiful, you have perhaps occasionally seen one with

white zigzag paths all over it. That is made by the tiny grub of a little Moth. It is too dainty to eat the skin of a leaf—you know leaves have skins, don't you?—so it eats its way through the green part of the leaf. You can generally find the little miner curled up at the end of his long white path. But you'll have to look very sharp, for he's almost too little to see. There is also in the same picture, several leaves tunneled by this little fellow.

All the mothers I have told you about, only take care of their own babies. How much more wonderful are the ways of tame bees, and ants, who actually live in families, build immense houses, and devote their lives to bringing up the babies of all.

Wise men have spent lives in studying about them, and whole books have been written about each of them. It would take me a week to tell you all about them.

### *A FUNNY LITTLE LOG HOUSE.*

Very little it was,—not an inch long! It looked more like a tiny bundle of twigs; but there it was, a genuine house, regularly built and stuck together, lined with silk, and the owner shut up in it like a prisoner.

I found it in the woods one day, and you can find them, too, not only log houses, but tiny mansions of stone and straw. That is, if your eyes are sharp. You might walk over a whole village of these droll atoms of houses and never see one, if you were not very careful.

The little fellows who build such curious houses for themselves, belong to a family that I'm afraid you don't like very well,—the Caterpillar family. But, perhaps, you'll like them better when you know more about them.

Of course, you know that all the members of this family, after crawling around the world as Caterpillars, become at last gay, beautiful Butterflies. But, perhaps you don't know that each one of them has to make for itself a house, where it can shut the door, and be safe from its enemies, while the wonderful change happens to it.

One little fellow, a black, prickly Caterpillar, who blossoms out into the Tortoise-shell Butterfly, takes a funny way to build his house. The first thing he does is to put himself into a position where you think he couldn't do any thing,—he hangs himself up by his last legs, with his head down, of course.

Here he is all hung up. How would you go to work to build a house hung up by your heels to a tree?

I'll tell you how he does. In the first place—to get a good hold, so that no wind will blow him off—he spins silk threads, like spider webs, around a twig, till he makes a sort of a loose network sack. His legs are armed with hooks, so when the network is done, he just hooks his last pair of legs on to it, and lets his body hang down.

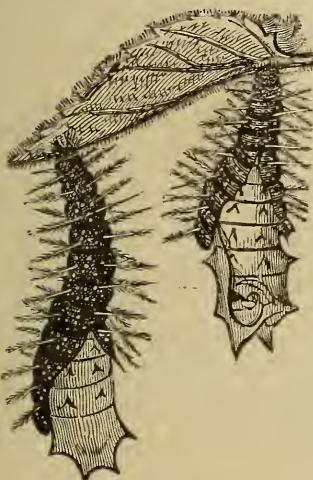
Then a very droll thing happens. Before he builds his house, he wants to get rid of the old Caterpillar skin. I suppose you know that this family change their skin as easily as we do our coats and dresses!

Well, this prickly gentleman, after hanging awhile, gets uneasy, wriggles about, and finally splits open the back of his



skin. Here he is again, you see. Then he twists and pulls, and draws himself completely out of the black coat, and hangs his new white body to the same network. In these two figures you see him getting out. Naturally, he don't want his old black, worn-out suit hanging there by his side, so he proceeds to get it off. You know it is firmly hooked on.

Well, the curious little fellow seizes it, and gives himself a jerk that spins him around like a top,—usually the skin is twisted off at once. But if it is obstinate, the plucky little fellow tries again, turning the other way. When it is broken off, he lets it drop, and then settles himself for his change.



You've seen the pretty little white Butterfly, so common in Summer. You country children know it as the Cabbage Butterfly. This builder makes his house in a different way. First, he hangs himself to a branch in some such way as his black relative did. But he don't consider that safe enough, so he ties himself on to the branch by cords passed over his body. In Fig. 1, on next page, you will see him in the very act. He can turn his head over his back, doubling himself up, so he leans over, fastening a thread to the twig on one side, then moves his head over and fastens it the other side, and so on, till he feels safe, when he is tied in like a squaw's baby to a board.

Some of the little builders make their houses of the silk threads they can spin. You have heard of the silkworm, that makes a house so valuable to weave into silk for our use, that it is cultivated for that purpose. You will see it on next page, Fig 2. This is the house of a Japanese silkworm.

Another little fellow, not satisfied with a simple silk tent, ornaments it with hairs, which stand out all around, making it look like a ball of fur. Perhaps you wonder where he gets the hair; but nothing is easier; it grows on his own back. He deliberately takes the tufts of hair in his teeth, and pulls them out, planting them in the house he is building, and fastening them by threads. When finished, he hasn't a hair to his back; but he don't care

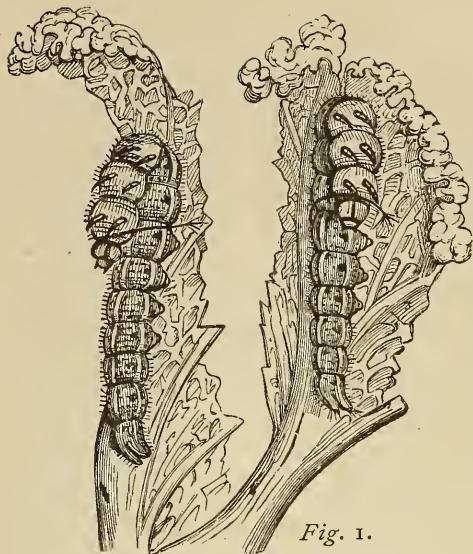


Fig. 1.

a bit for that, for he has a nice warm house, from which he will come out a Butterfly, that has no need of a house. Of course, you want to see the picture of such a droll little building. Here it is, at bottom of page.

But not all the Caterpillar family have hair to use. The Pimpernel Caterpillar draws the edges of a leaf together, and spins a thin white silk robe for itself inside of that.

One of the funniest houses is built by a hard-working little fellow called *Pyralis Corticalis* (I hope you'll remember his name). It is made of tiny pieces of bark, actually

glued to a tree-trunk, and to each other. He builds the two sides separately, and then draws them together.

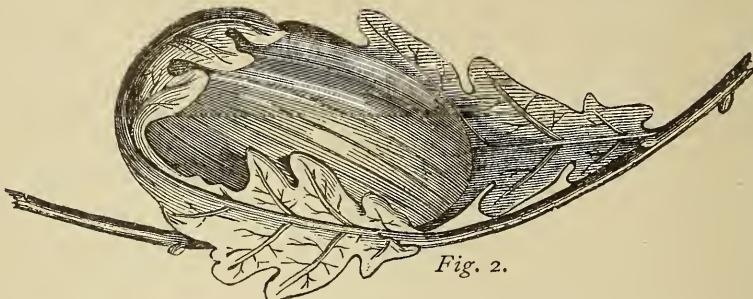


Fig. 2.

You will find it on next page,—magnified, of course; the house isn't much more than half an inch long when done.

The very coziest house I know of is made by one of the tiniest fellows you can imagine. He eats out the inside of a grain of barley, and lines it with silk. He even divides it into two rooms,—one to live in, and one for rubbish. I think that is the daintiest house I ever heard of.

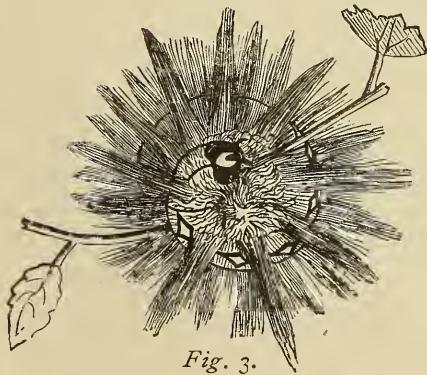
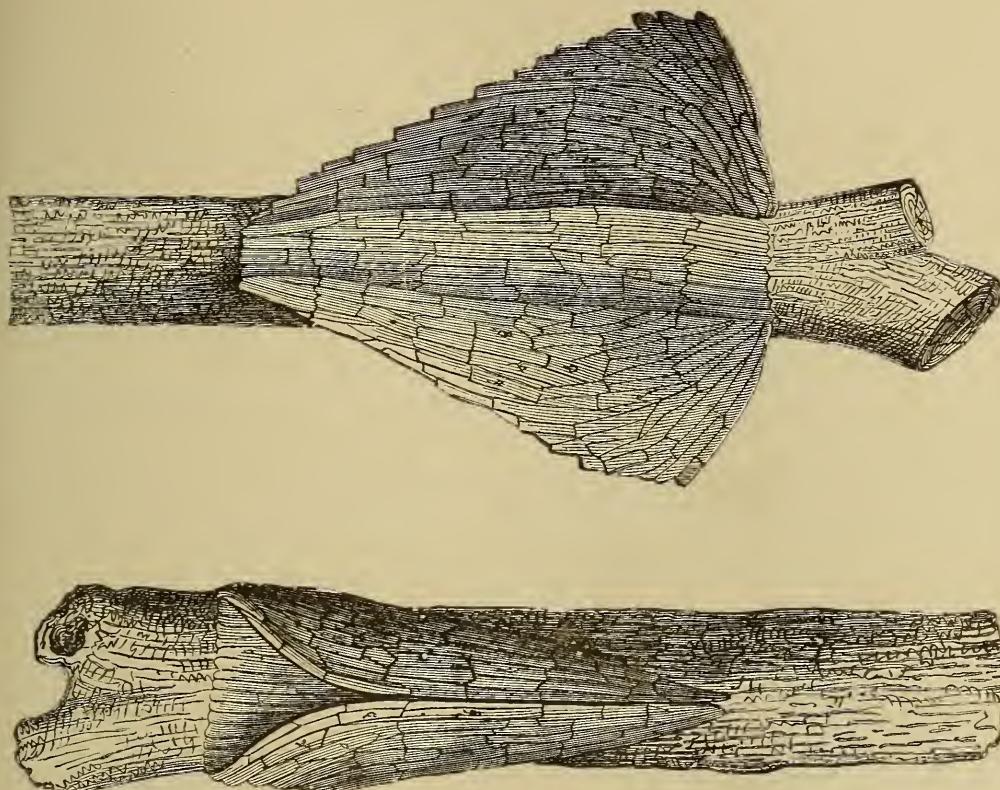


Fig. 3.



The last little fellow I shall tell you about—only a quarter of an inch long—is not really a builder ; in fact, he's a murderer and a thief, and gets his house in a very bad way. He has a fancy for a snail shell to live in, and he don't object to snail meat to eat. So he fixes himself by a sucker to the snail shell, holds a pair of pincers ready, and when the poor snail is obliged to open his door for a little air, the murderer cuts the muscle which holds the door shut. Then, since the snail can no longer keep him out, he can eat him up at his leisure, and then go into his house to live. Then, when he casts his skin for the last time, he just stuffs the old coat into the snail's open door, and there he is, safe and dark, till he is ready to come out with his wings, a beetle ; for this naughty robber never gets to be a beautiful, innocent Butterfly, but a miserable black beetle, as he deserves to be.

*LET ME INTRODUCE HIM.*

Are you acquainted with *Blatta Domestica*? I'll warrant his trim, brown coat is perfectly familiar to you, if you live in a city. You've found him in your trunks and bureaus; cook finds him in the bread dough; he gets smothered in the flour barrel, and drowned in the dish-water. He's very shy, though, and you wouldn't be likely to see him at all, unless he met with some accident.

You can hear him, however, if you'll sit still a few minutes in a dark room, in New York city, and a good many other cities. You'll soon be aware of thousands of light footsteps all over the floor. Papa and Mamma Blatta will be out, and all the children and grandchildren, aunts, uncles and cousins. Gay times they'll have, till you make a noise or strike a light; then they will disappear, and you may hunt an hour, and not a sign of one can you find.

Perhaps you'll know him better if I tell you his every-day name, for *Blatta Domestica* is his scientific book name. You call him simply, Cockroach.

He's a very pretty fellow—though perhaps you don't think so, --his eyes are blue and white, (did you know that?) and his droll, flat body is a rich brown. Then he's such a quick little fellow. No matter how suddenly you strike a light, he's out of sight almost in an instant, and he doesn't use his wings either, he just runs, darting like an arrow across the room.

He has one thing that I guess you'd like, and that is a pair of jaws that can bite even wood. You wouldn't need nut crackers or saws if you had such teeth, or *mandibles*, the books call them. You know if we want to be very wise, we'll have to remember some of the book names.

There is another curious thing about him—he is very hard to kill. You may cut off his head, and it will run off on two legs, while the body runs away on four. Of course you know by this time that all insects have six legs. You may split him open, cut off his legs, or any other horrid experiment you choose to try, and

every leg will be alive, the jaws will work, and, in fact, every separate part seems to live by itself.

I hope you'll take my word for it, and never try it for yourself, for it is a very cruel thing to do, and even naturalists, who have to kill these tiny creatures to find out all about them, almost feel as if it was wicked to experiment on this poor little fellow.

But I must tell you what these wise men have found out about him. In the first place, Mamma Cockroach takes good care to provide for her babies, as do all mothers, from the elephant down to the tiniest little insect you can find. This little mother finds a dark place under a shelf or table, and there she glues the tiny eggs so tight and safe that no jar will displace them. In two or three weeks the babies come out, and funny bits of things they are too, white as snow, and so little. When they are a few weeks old, they throw off their first coat, and come out in a new one, a little larger than the baby clothes. Four times they change their suits this way, till they are full grown.

A singular thing happens when they take off their last coat. They come out perfectly white, like a most delicate and exquisite ivory carving, with lovely blue eyes ; very soon they begin to grow dark, and in a few hours they are the dark creatures you know so well. You needn't think the Cockroach has no troubles. Besides the cook, the housemaid and the whole family, who lie in wait to smash him any time, he has a smaller enemy that he can't run away from. That is a tiny atom of a fly, that provides food for her babies by fastening the eggs to the body of the Roach. Very little white specks they are. When the eggs hatch, a tiny worm comes out, and as Cockroach meat is his favorite food, he finds his feast all ready for him. So he just eats up the Roach.

We who are so much annoyed by the impudent Cockroaches, feel very friendly towards this useful little fly.

You will laugh when I tell you that Cockroaches are useful. If you put a quantity of them into a kettle, and stew them very slowly, you will get a nice, clear oil, which is said to be good to relieve neuralgia.

*Blatta Domestica* isn't the only one of the family that lives among us ; there's his cousin, *Blatta Orientalis*. This is a very impudent fellow. He'll gnaw your toe nails when you're asleep, eat up your books and your breakfast, and in every way make himself an extremely disagreeable fellow.

You can't scare this fellow with a light, by a good deal—he'll almost turn and fight you, he's so bold. Then he has an outrageous fashion of eating his brothers and sisters, cousins and babies. A regular cannibal, he is.

Such eaters you never heard of. Why, they will eat the thread your shoes are sewed with to get the wax, your muslin dresses and linen pants for the starch, and in fact, he is an unmitigated nuisance.

I think it would be a good plan to stew them all up for oil to relieve neuralgia ; don't you ?

I must tell you a little more about the way Mamma Cockroach puts up her eggs, so that they may be safe from all enemies. She makes a tiny bit of a turnover. Don't laugh ; it is—or at least it looks—exactly like the apple turnovers your grandmother used to make for you. It is all round and smooth on one side, and pressed together in little notches on the other side. If you should open it you would find sixteen tiny eggs in two rows, like peas in a pod. The scientific name of this turnover is a word which means "egg-purse." When the little ones are hatched out, they escape through the notched side, and it closes after them, and looks exactly as it did before. I have read a story of two girls who were fond of these disgusting creatures—to eat. They were at school in London, and at night they would get up, go down to the kitchen, catch and eat the Cockroaches. And even after they were found out, they could hardly be kept from it.

The smell which always hangs around the haunts of this creature is extremely disagreeable.

A gentleman who once occupied a cabin in a ship, with some thousands of Cockroaches, tells some amusing things about them. I give as nearly as possible his own words.

"There are two kinds in my cabin, one about an inch long, and the other two inches and a half. They have (the larger ones) legs of great size and strength, requiring fifteen or twenty ants to carry one off. On these legs he squats, sticking out his elbows—as it were—except when he rises on his forelegs, which he does to stare you in the face, or look about. He prefers walking slowly, but if you make a noise, he quickly takes the hint, and hurries off. Mamma Cockroach attaches her eggs to anything she likes—a dress coat, a cork, a biscuit, or a book.

"In character they are cunning as a fox, greedy as gluttons,

impudent, cruel, treacherous, cowardly scoundrels, and thieves. They will not only eat each other, but devour their own legs when accidentally cut off.

"In no way is their cunning exhibited better than in the cautious way they conduct an attack upon a sleeper. A few spies creep up to your pillow and have a look at you. If you look at them, they turn around and walk off, trying to look as much at their ease as possible. Pretend to sleep, and soon one of them walks down the pillow to your face, and stands by you a few seconds in silent meditation. Then, cautiously lowering one feeler, he tickles your face. If you are still, he tries it again. If still quiet, the work of the night begins. The spy walks off, and soon returns with the working party. The hair is searched for oil, the ear examined for wax, and every exposed spot comes in for a good search.

"They are cannibals by profession. They eat not only dead companions, but if one gets sick or hurt, they eat him. They suffer from a chronic state of thirst, and every morning you find thirty or forty in the wash basin. They will drink brandy as readily as water, and get drunk and become very lively, running about and flapping their wings.

"Occasionally they come out by thousands, and perform a reel or Cockroach quadrille, to their own great delight. This lasts two or three minutes, when they all run home.

"They eat everything, drink brandy or wine, or ink, or even medicine. One night a dozen blue pills were left on the table, and soon a dozen Roaches walked off with them, each one carrying a pill. The next morning the floor was strewn with the dead and dying.

"The small Cockroach differs from the large one only in size; he possesses all the vices of the big one.

"I once saw a curious scene. A big one ran over me, and I gave it a slap with a book. He fell on the floor as if dead, and so thought a small Roach, who was on the watch. So he dashed out to get a fine feast; he seized him very pompously by the foot, and commenced dragging him towards his hole. Unfortunately, the big fellow began to revive, and finding himself moving, instinctively he pushed himself along with his hind legs. The little fellow in front evidently swelled with pride at his own strength, and he pulled away till, the help getting more, he began to be astonished, and looked around.

"Fancy his terror and fright, as he saw the monster creeping stealthily after him! He dropped the leg and ran for his hole, half scared out of his wits, and never looked back once."

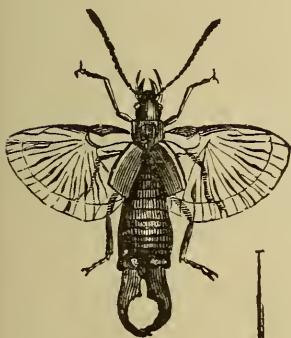
The great enemy of the small Cockroach is a spider; a little larger than our common house spider, and much stronger. They have a very ingenious way to capture the Roach. When a spider wants fresh meat, he comes out from his web, attaches one thread to a beam in the roof, and another a little further down, and then goes down and waits. By-and-by some unwary Roach crawls along over this thread. Instantly the spider rushes out, makes a half circle around him, lets go the second attachment of thread, which is now entangled in the leg of the Roach, and by some peculiar movement he is swung off, and hangs by the feet in the air. The spider stands coolly by and looks at his struggles.

Soon the spider runs back to the first attachment, and goes down the tiny rope to his victim. He first kills him by eating a hole in his head between the eyes. The next thing is to bring him home, and the manner of this is truly wonderful. A thread is attached to the lower side of the Roach. The spider then climbs up his rope with this thread and attaches it so high that the Roach is turned upside down. He then hauls on the other thread and turns the body again. Again he attaches the thread, and so he goes on till the Cockroach is by degrees hoisted to the wall and deposited in a corner.

But in this hot country it would soon spoil, so the spider proceeds to hermetically seal it up for future use. He encloses the body in a case of glutinous substance, so that, in fact, it lasts the spider a week. At one end he leaves a little hole which is closed up after each meal.

*A GOOD LITTLE MOTHER WITH A BAD NAME.*

There is a very nice, careful little mother, not an inch long, who never does a bit of harm. On the contrary, she is quite useful to us and perfectly devoted to her babies. Yet shocking stories are told about her, and it's all on account of her name.



You see she has a very droll pair of wings. She seldom opens them; but when she does they look something like a human ear. So the poor creature got the name of Ear-wig or Ear-wing. Whereupon some people, who thought they knew everything, said she was so named because she had a fancy for getting into people's ears! And then every ignorant and stupid nurse-girl repeated it to the children. So it went on spreading, like other scandal—and nothing in the world *can* spread like scandal—till everybody got to be dreadfully afraid of the innocent little creature, and nobody dared lie down on the grass for fear a prowling Ear-wig should take up her quarters in his ear. So her reputation was thoroughly established as an evil-disposed mother, and even the wise men who make the books fell into the error.

Don't you believe a word of it! Nobody would be more frightened than she to find herself in such a place. And, if she did happen to stray in, she couldn't possibly get further than the drum of the ear (you know you have a little drum in your ear, don't you?)

But she has altogether different ideas about a nursery for her babies. She much prefers a damp wall or a hole between bricks. This she prepares very carefully and nicely, by smoothing the stone or brick, making a nice bed of brick-dust, and altogether a very cozy and comfortable house, about as big as a lady's watch. When the house is fixed to her taste, she lays her eggs.

But her work isn't yet done; in fact, it's hardly begun. Every day, for three or four weeks, she turns those eggs—I don't know how many dozens of them. At the end of this time they hatch, and out come a whole tribe of babies.

Not a bit like their mother, in her sober dress of brown and lead color; but tiny atoms of creatures, in white, like other babies.

They're a lively family, though; and every day Mamma Earwig takes the whole troop out on a foraging expedition. Selecting some deep flower, where there is plenty of pollen for the babies to eat, she leads the whole family into it, and there they spend the night—for they never go out in the day light.

Think of going pic-nicing and spending the day in the heart of a lily cup.

Well, when it grows light, the whole family return to the home; and thus they live for five or six weeks. All this time the babies have been growing, and every now and then throwing off their old skin and coming out in a bran-new suit, somewhat larger than the last. That's the way insects have of changing their dress—perhaps you know.

Now comes the sad part of my story, for I am sorry to say it winds up with a tragedy.

As these ungrateful babies come to their full size, forgetful of the constant care of their good little mother, unmindful of the cozy home and the nice pic-nics they have enjoyed with her, these wretched little cannibals actually *eat up their own mother!*

Of course, that breaks up the family. The unnatural children throw off their last suit, come out with gorgeous wings, and fly off the first thing, to seek their own fortunes.

Besides the slander about the ear, there's another naughty thing said of this unfortunate mother. She does (it must be admitted) eat holes in melon-rinds and the leaves of plants. But when you know more about it you'll be ready to thank her, instead of abusing her.

Every bite she takes is to eat the eggs of some other insect, which are her special food. If she did not eat those eggs, they would hatch, and not only the rinds, but every bit of the melon be eaten. She must be allowed to be very useful.

In fact, the more you know of these wonderful little bodies the more you will find that every one has its use. Some are made to prevent too great growth of vegetation, others to thin out the ranks of their fellow insects.

Those busy little worms who dig in the ground, and whom we call nuisances, are, in truth, doing a most important and useful work. By their incessant wriggling and twisting around in the

ground they keep it mellow and soft, and thus suitable for the growth of plants.

But there's another funny thing I want to tell you about this little mother with a bad name. At the end of her tail she has a sort of a pair of forceps. You'd never guess what she uses them for; but one of those inquisitive naturalists, who spend their lives studying those little creatures, found out by watching, just what Madam Ear-wig does with her forceps.

You must know that her wings, which are so beautiful, are packed away in a very small place. They are first folded like a shut-up fan, and then doubled twice the other way. Now, when the droll little mother wants to fold her wings and pack them safely away, she just turns her tail up over her back, and with the forceps, as if they were hands, she folds and tucks away the wings.

It's almost too funny to believe; but the Rev. Mr. Wood declares that he has seen her do it.

*A LITTLE DARK NURSERY UNDER THE GROUND.*

Maybe you think you wouldn't like a dark nursery under the ground, but you would if you were a Bombus. Your mother would dig it out with the greatest care, a foot or so under ground, nice and warm and safe, with a long dark passage leading to the air.

But you don't know what a Bombus is!

You've often seen her buzzing around the flowers in the garden, brushing out the honey with the little brush she carries in her mouth. You call her Humble Bee, or perhaps Bumble Bee; and probably you have seen her coming home many a time, with two baskets full of pollen to feed her babies.

You never saw any baskets?

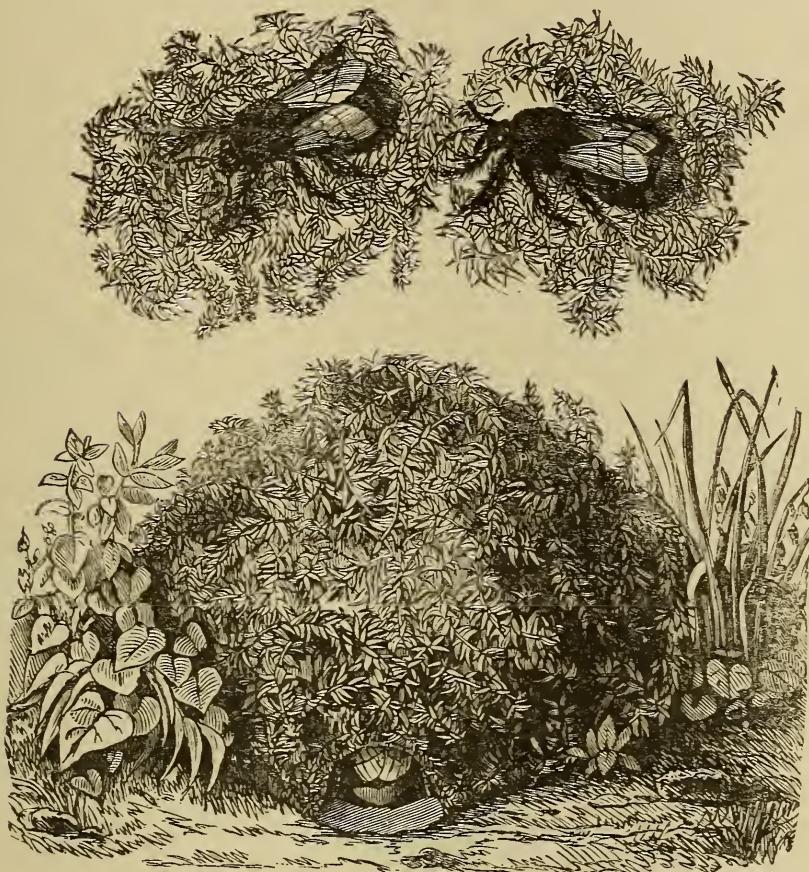
Well, that's because they're too little to see. She isn't big enough to carry a market-basket, you know; besides, she has no hands, and she has to use all six of her legs in walking; so she has on her hind legs two of the cunningest baskets you can imagine, made of stiff hairs; in fact, they grew there on purpose. They're so little you'd need a magnifying-glass to see them.

This odd little mother doesn't make her jars of honey six-sided, and all nicely packed in together, as do her cousins, who live in a hive; they are loosely scattered around, but the honey in them is delicious, as you'd find out in a minute, if you could get at them.

You've heard that verse, "How doth the little busy bee," a hundred times I dare say, so I won't repeat it, but I want to tell you how *this* little busy bee works.

When the cold winter winds come in the Fall, perhaps you know that most insects die, but this little mother doesn't get off so easily. She hunts around, and finds a snug, safe place,—not in her home, as you'd suppose she would, but in some hole in a hollow tree, or under a haystack, or some such funny place. All Winter she lies there, with no food, in a sort of sleep, but the first warm days of Spring wake her up, and out she comes, ready to go to work.

The first thing to do, of course, is to find a soft place in the ground where she can dig. She doesn't make the house very large at first,—only a little way down she hollows out a place, and lays a few eggs. You see she has no idea of making a big nest alone for her two or three hundred babies. She wants some help about it.



Soon, these eggs hatch out, and, you'll hardly believe it, but the babies are little fat white grubs! Like a good mother, she now goes out every day, and brings in her baskets of pollen to feed these hungry little grubs, till, by-and-by, they stop eating, spin a sort of silk ball around themselves, and stay there out of sight till their wings grow, and they get to be like their mother. Then they just bite a hole in the silk ball, and step out, ready to help their mother,

like good little bees, as they are. With their help, the house is made larger, and then many more of the grubs are hatched, until before fall, the hard-working little mother has often two or three hundred children in her house.

The *Bombus* belongs to the family of social Bees, called so because many of them live in one house.

Another of the family is called the Stone Humble Bee, because she prefers to build under stones.

Still another is the Moss Humble Bee. She finds or makes a little hollow in the ground, over which she builds a roof of moss or grass. It is shaped like a tiny hut, and lined with wax, to keep out rain. You can see it in the picture, with Madam *Bombus* just going in.

All these Bees have the little baskets on their hind legs, and the way they fill them is to go into the flower and twist about till they are covered with pollen, and then carefully brush it off with the brushes they have on their legs, and pile it up in the baskets.

There is another larger family of Bees called Solitary Bees, because each one lives alone. Some of them select curious places for their nests. Some bore tunnels in wood ; others take out the pith of bramble-sticks ; still others, called Leaf-Cutters, line their nests with pieces of rose leaves, which they cut out themselves.

But the oddest home of all is made in an empty snail shell. The Bee mother lays an egg in the farthest corner of the shell, puts in the pollen and honey for food, and then builds a partition wall.

Then comes another egg and stock of food, and another wall, and so on till it is full, when she makes a firm wall. When the little ones are ready to come out, they bite their way through the walls.

All this is about Wild Bees. If I should try to tell you about the ways of Hive Bees, it would take a whole book to do it.

The man who has found out the most about the ways of Bees, was Peter Huber, and he was blind from the age of seventeen. See what can be done, in spite of unfavorable circumstances, by a determined will.

### A CURIOUS LITTLE BUILDER.

There's a funny little creature in a buff satin dress, who likes to live in our houses, though I must say she isn't very welcome, and we try our best to drive her off.

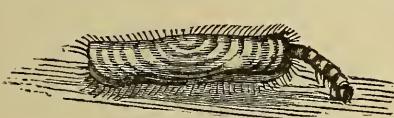
Not but what she's pretty enough, but she has a most unlucky fancy for making her nursery in our furs and woolens. When we find bare places in our muffs, and tiny holes in our flannels and broadcloths, we have good reason to be very much vexed with Madam *Tinea Pellionella* (I wonder how she'd like that awful name, if she knew it.)



You see this little mother is a bit of a fly, not more than a quarter of an inch long. We call her a Moth, and she glues her minute eggs to the hairs of furs or woolens that she finds hanging up in closets, or packed in trunks, unless the trunk is perfumed with camphor or tobacco—which she hates. After the eggs have been there two or three weeks, they burst open, and out comes the baby. It isn't a buff fly like its Mamma, but a tiny white worm, and it proceeds at once to build a house for itself.

This is the way they go to work. The little builder reaches around till he finds a long hair—long to him, I mean—which he cuts off close to the cloth. This he lays lengthwise of his body, then gets another and lays it by its side, fastening them together by silk threads, which he spins as he works. Thus he goes on, cutting, spinning and weaving, till he has a house large enough to cover his body and turn around in.

You can see how he looks in the picture.

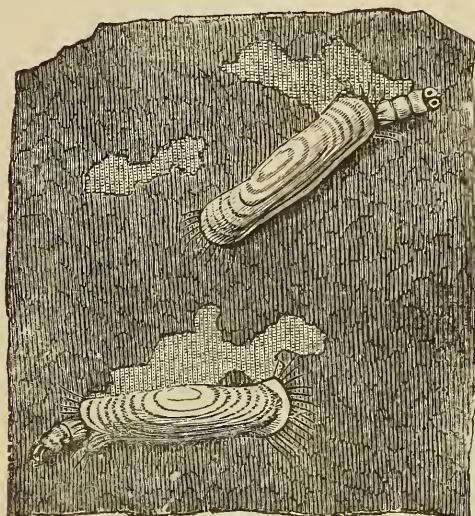


All this time he has not eaten a mouthful, and he never does till his house is done. When he does eat, he cuts those tiny pin-holes you've seen in cloth, for he eats the solid cloth and not the loose hairs he builds with.

He's a wise little creature, too. If you have a costly broadcloth by the side of a cheap woolen, the cunning little mother will settle her babies in the broadcloth, and leave the coarse woolen for less

dainty babies than hers. That isn't because she is malicious, but merely because there's less oily matter in the best cloth. And the baby himself, though he wanders around to other goods, won't touch anything common while he can get fine clothes to eat.

When he begins to eat, he eats so much that he soon finds—as you children do—that he's too big for his clothes. Now, when that happens to you, your Mamma just buys you a new suit, but the poor Baby Moth has to make his own suit, you know. What do you suppose he does?



comes a tiny buff satin fly, just like the Mamma who first glued the eggs to the broadcloth.

This little mother isn't the one who spoils our carpet for us, though she is a cousin. The Carpet Moth is called *Tinea Tapezella*. It's a prettier name, though it's a very mischievous little fly, and we take good care to put plenty of camphor and tobacco around the dark corners, so that she shall not set up her nursery in our houses.

I will tell you. He just cuts a slit in his coat—or his house—and proceeds to put in a new piece, patch it, in fact. It's no small job for him either, it takes him a week; but when it's done, he has no more trouble about it; he just goes to eating again.

When he has eaten enough, he shuts up the end of his house and hangs it to shelf or wall, where he thinks it will be safe. Shut up in that snug dark nursery, a mysterious thing happens. Wings develop, legs grow, and after awhile the house bursts open, and out

*HOUSES A MILE HIGH.*

If a man should build a house of clay, a mile high, with no tool but his own hands, it would be thought a wonderful thing, and yet it is no higher in proportion to his size, than the houses built by the White Ants.

These Ants are curious creatures. They always work in the dark, and under cover; and the first you know of their house, it rises out of the ground roof first, as you may say. They go on growing in size till they are seventeen or eighteen feet high, shaped like a sugar loaf, and covered all over with smaller mounds.

The inside is full of rooms and passages, and yet so strongly is it built, that men and even cattle can stand on them with perfect safety. Even then these indomitable workers are not satisfied; but they tunnel out long passages thirteen or fourteen inches high, to connect with other Ant-hills, or to look for food.

Suppose our roads had all to be tunnels, and three hundred feet high. That is no bigger for us than the thirteen inches for the Ant.

All this without one Ant getting into sight. You might have a dozen of these ant-hills in your yard, with millions of Ants, and never see one.

The most curious thing about them, I think, is their taste for destroying wood and paper—and, in fact, anything they *can* destroy. They will tunnel under a house, eat out the inside of every beam and board of the floor, leaving walls no thicker than paper. They will bore through the floor into the legs of chairs and tables, eat out the inside of them, and the first one knows of it, the chair falls to pieces under him, or a flight of stairs crumbles into dust when stepped upon.

I think one must feel very insecure in those countries. In one case that I read of, they got into some packages of valuable papers, and destroyed every particle except the top leaf of every bundle, and a thin wall of the margins, leaving just a paper box.

Not all these little creatures are workers. They keep a standing army of fighters, who do nothing but fight; and very fierce



they are, too. They will hang on to an enemy till they are pulled to pieces. They will draw blood on a man's leg in a moment.

They have also a king and queen, who though treated with the greatest respect, are, alas! prisoners for life in their little room. They are larger than the rest of the tribe, and while there are many doors to admit attendants to the room, they are far too small for the royal pair to get out.

I don't know as they care about getting out. The queen, at least, has too much to do to have time for airings, for she lays eggs at the rate of eighty thousand in twenty-four hours, which must keep her busy. However, she don't have to take care of all her babies, for hundreds of the workers are constantly employed in putting the eggs into their cradles, or cells, attending to the hatching, and feeding them till they can feed themselves.

It is nearly impossible to get a chance to see the inside of these ant-houses, for as fast as they are pulled down, and the gallerys exposed, the workers rush in by millions, each with a piece of clay in its mouth, and stop up every passage, while the soldiers fight with the greatest fury.

If the queen is taken out, they never leave her, but will get clay and build a thin dome over her, to shield her from harm.

Much mischief as they do, however, they do one very useful work. In tropical countries, where the trees grow very large, and tornadoes are common, many trees are blown down, and the ground would be covered with them but for these industrious little creatures, who eat out the inside, leaving only a thin rind of the bark.

They are very good to eat. Birds are very fond of them, chickens snap them up greedily, Ants run after them and devour them by the million. Negroes of South Africa cannot get enough of them. They roast them and eat them by handfuls. The Indians make them into a sort of cake, and in fact, they seem to be the choice morsel of the country.

They are called White Ants—but they are not Ants at all—they are Termites. You can see their house in the picture.

*A QUEER LITTLE FELLOW.*

Isn't it a queer little fellow who knows everything as soon as he's born, and builds a house for himself before he's one day old?



Everything about him is curious. To begin with, he lives at the bottom of a pond or river. At first he was nothing but a tiny

atom of a green egg, stuck to the stem of some weeds under the water. After a while the egg burst open, out crawled Mr. Worm, and proceeded at once to look for building materials.

You see, except his head and neck, which are protected by a hard covering, he is a soft little worm, and he wouldn't live long in the same pond with fish, and bugs, and spiders, who have nothing to do but to eat, and are always hungry, unless he had a safe home.

So, of course, he goes, the first thing, to building.

There are several branches of the family, and they all build droll little houses, though they're not all alike. One of them hunts up two dead leaves, and glues them together in such a way as to leave a nice cozy home between them. It's perfectly safe; for who would suspect an old dead leaf of being anybody's house?

Another of the family builds of stems of grass, cut off and fastened together side by side, till they look like a bundle of straw.

A third member of this interesting family wants a more elegant house; so he takes tiny atoms of shells, often with the owner inside, glues them together, and lives in a shell house.

Others use grains of sand and tiny stones. In fact, there seems no end to the different things these industrious little fellows find to build of.

No sooner is the house done, than Mr. Worm moves in. He don't have to wait for painters and furniture-men,—happy fellow! He just goes in and fastens himself there by means of a pair of hooks he has at the end of his tail, and then he's ready to live.

The next thing is something to eat. So he starts off, taking his house with him, to hunt up some bits of green stuff, or some atom of a worm smaller than he is.

But strange things happen to this bit of a worm at the bottom of the pond. His life is full of wonderful adventures. If he was bigger, he'd be the wonder of the world.

After eating as much as he can—stuffing himself, in fact—Mr. Worm thinks it's time to retire from the gay world; so he finishes his house by hanging before it a silk door,—no loose curtain, but a tightly-woven network, which he spins and fastens carefully on every side.

Now, whether he goes to sleep in his comical little house, or what he does, nobody knows, because nobody can peep in, you know. But something goes on there in the dark, for, after awhile, the little prisoner opens the door, comes out of his house, crawls

up the stem of some weeds till he is out of the water, and then—you'd never guess what happens!

Why, his old skin just splits open, and he pulls himself out,—no longer a miserable little worm, but a gorgeous four-winged Caddice Fly, dressed in a neat suit of brown. And he cares no more for the bottom of the pond, and his old straw or shell-house. He sails off on the air, a gay, dancing fly.

You know I told you he was rather greedy when he lived in the little house down under the water. Well, I think he was not so much to blame for eating as much as he could, after all, for what he had then was the last mouthful he ever ate.

You can hardly believe it, but you would in a minute, if you could see him with the help of a microscope. For with all his four gauzy wings, and splendid great eyes, he has no mouth.

Of course, he hasn't the least desire to eat. He just flies over the water, or runs about on it, as, no doubt, you've often seen him, for a few hours, and then dies—of old age.

Before the Mamma Caddice Fly dies, however, she is careful to go down under water, and glue her odd little green eggs to some water-plant, so that they will be sure to hatch out into soft little worms, such as she was herself before she got her wings.

And these curious little creatures, who have such wonderful lives, are not an inch long.



*THE SPIDER SPEAKS FOR HERSELF.*

I suppose you think we Spiders are nobodies because we go about quietly minding our own business, neither flaunting in gay

colors, like Madame Butterfly, nor making noise enough to craze one, like Mr. Humble-Bee. But I can tell you the *Arachnida* family is more ancient than the Human family, who take on so many airs, prying into our secrets with that impudent little microscope of theirs.

However, we're an honest and industrious family, and there's nothing about us to be ashamed of. In fact, I could show you some wonderful things, if your eyes were not too coarse to see them. There are my spinnerets, which spin out a beautiful silk rope of more than four thousand threads, as fast as I want it. Wouldn't you children think it fine if you could make a rope in a minute any time you wanted it?

Then you've never seen my combs ; you can't—they're too small. I have one on each foot, and I use them to keep myself free from dust, as well as my web. I don't like to boast, but I really think you would admire my eyes. I have eight of them—I don't see how you can get along with two, though to be sure you can turn yours about. They are placed in a square in my forehead, for I belong to the *Epeira* branch of the family. Those of us who live under ground have their eyes close together in the foreheads, and those who live in the air have them more scattered, so as to see all around.

Then I should really like to show you my babies, but alas!—they're much too small. I carry them about with me all the time, till they're big enough to take care of themselves. They ride on my back and head, and in fact, there are so many that they nearly cover me up.

Perhaps the most interesting thing about us, is the variety of our houses. I build my house in your garden, or bushes, and if it wasn't for the impudence of your gardener, and a destructive instrument—called a broom—you would see them oftener than you do. It doesn't become me to brag, but if you know of any residence more graceful or elegant than mine, I'd like to know what it is.

Some of my family live in a sort of tent made of a leaf lined with silk, which makes a pretty, though rather airy house.

One branch of the family builds a house—or rather a cradle—shaped like a tiny bell, and hung to a leaf or twig, where it rocks with every breeze. It is not larger than a pea, snow white, and very long. But after it is finished and filled with eggs, forty or fifty of them, the careful mother closes it up, and covers the outside

with mud, because, you must know, there are many greedy insects who will eat every Spider baby they see.

Others build hanging houses. Some are three or four inches long, slim and made of white silk; others are made of empty seed pods fastened together and lined with silk, for wherever one of the *Arachnida* family lives, she must have silk curtains to her house.

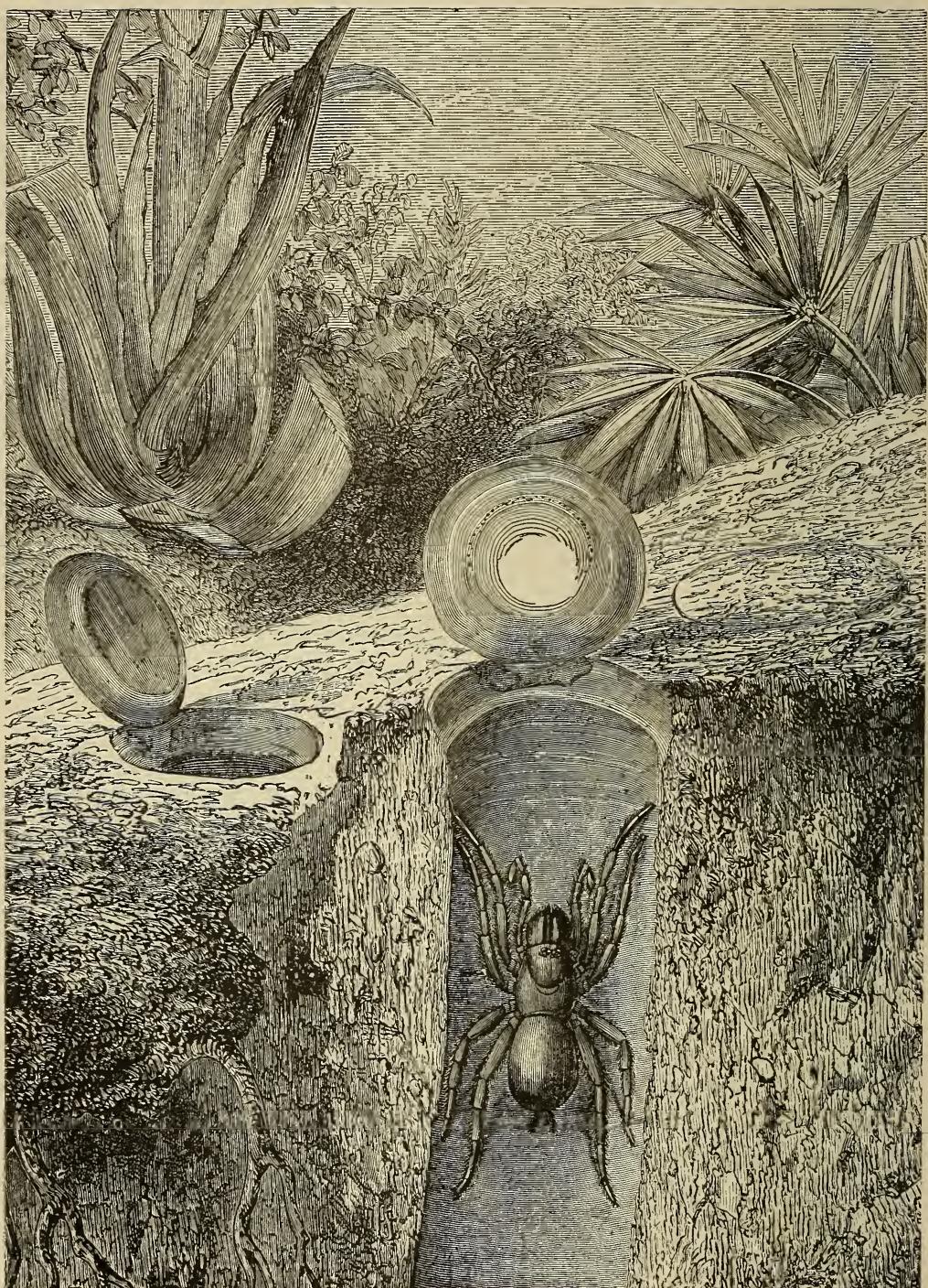
One of my relatives who lives in the West Indies—a splendid fellow, with body an inch and a half long, and bushes of hair on his legs—fastens his house to a plant, and it looks like an oval silk ball. It is very aristocratic and nice.

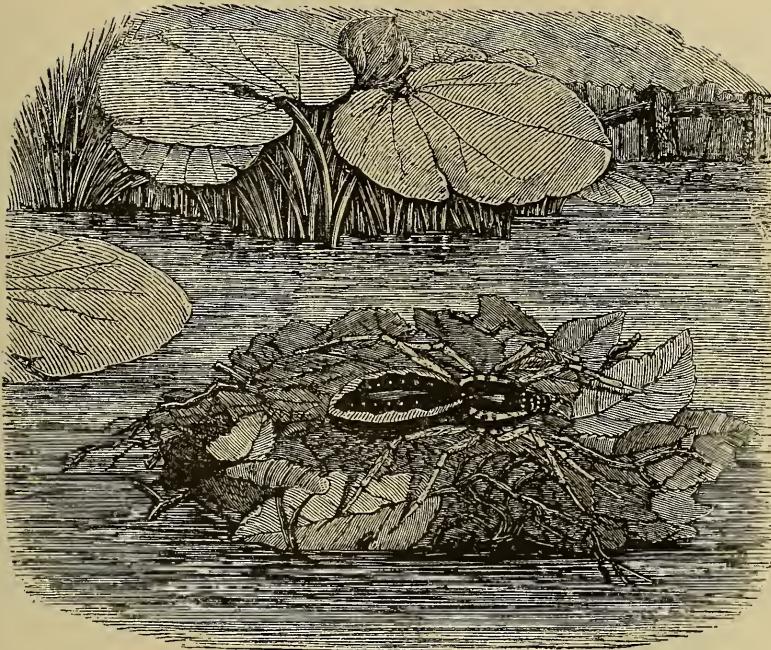
But I think the most wonderful house is made by the Trap-door Spider, another foreigner—native of Australia. She is quite large, more than an inch long, and she digs a deep tunnel in the ground, which, of course, she lines with heavy silk hangings. Then at the top she makes a door, so wonderful that she takes her name from it. It is made of silk, stiffened with some sort of gum. The outside is covered with dirt, bits of bark, etc., exactly like the ground around it, so that when it is shut it cannot be seen. The whole is hung with a hinge like any door. What do you think of that? Madam *Cteniza* (for that's her book name) often sits in her door to enjoy the air, but if any one comes near, she slams the door, and holds it fast.

In the picture, on next page, the front is cut away from one of the curious houses to show how it looks inside when its industrious builder is at home. The door is left open to show how it is made, though you must not suppose it ever stands open like that. My relative is too careful a housekeeper to allow any such thing. Two other doors are also shown, one open to display its thickness and form, and the other closed that you may see how nicely it is concealed when shut. In fact, the artist has made it show plainer than it does in reality, for careful naturalists have found it impossible to find the door through which they had just seen the owner disappear.

Some of my family have a strange fancy for living about the water. One of them is called the Raft-Spider, because he makes a raft of leaves and sticks, held together with silk. On this he sails around, eating such food as he can find on the water. He can run on the water too, easily. There is a picture of him on next page.

The most singular one, who builds a snug house under water, and spends all her time there, is called the Water Spider. Now





you know that *Arachnida*—as well as you—must have air to breathe, and one would think they must live on land; but this Spider is so determined to live away from her relatives, that she builds a beautiful house of silk, the shape and size of a thimble, with the open side down, and actually fills it with air herself. I'll tell you how. Having finished the house, she goes to the surface, sticks one end of her body up into the air, then gives a jerk, and actually carries a tiny bubble of air under the water. It is held partly by the long hairs on the body, and partly by the hind legs. When she gets to the house, she turns around, and lets go the bubble. Of course it goes to the top of the little thimble, and there it stays.

You can see her in the picture at the head of this article.

In this wonderful way, bubble by bubble, air enough is carried in to fill the house. And there she lives, bringing her dinner there to eat, and making a nursery in one corner for the babies, who live at home till big enough to build thimble-castles for themselves.

I must tell you a little about the giant of our family, though he is a foreigner, and I never have seen him. He is called the Great Crab Spider, and he is two and a half or three inches long, and his

legs at least five. There's a giant for you! He is not dependent on catching flies for his dinner; he is bold as he is big, and he bravely goes out to hunt for himself, without any net to catch his prey. He is a night Spider—that is, he prefers to sleep through the vulgar light of day, and hunt by night, when the birds are all in their nests. Then he creeps up in the trees and seizes a humming bird or some other not very large bird which is stupidly sleeping in its nest, and being very strong he nearly always succeeds in killing it. Sometimes, instead of a bird he will take a tree lizard.

The mother of this family puts up her eggs in a bag of white silk, which she carries about with her. She sometimes has as many as two thousand eggs in one, for some Spiders believe in large families. There can't be too many of such very useful and interesting creatures as belong to my family; though, by the way, perhaps you don't think so. Well—tastes differ. The talons of this giant are very large, and the people who live in his country take them away from him, and set them in gold, for toothpicks. They are said to keep away toothache.

I have heard a story told about one member of this family. It is said that an English naturalist saw some of them which had been caught and made slaves of, led around by a string tied around their waist—by the children in South America. The cruelty of you human creatures is shocking to think of. I grieve to think of my noble relative made a slave, and following at the end of a string. But life is full of trouble!

One branch of our family is called the Wolf Spiders, and very well they deserve the name, for they scorn to make nets like the feebler Spiders, to catch their prey, but they hunt it by chasing it. One of them is fond of bees, and will eat scarcely anything else. The celebrated Tarantula belongs to this family, and that reminds me to speak of the absurd story that you human beings have believed so many years, that the bite of this innocent Spider causes a horrid disease to your kind, which can only be cured by music and dancing. For many years, my respected relative was slandered by you, and never had a chance to clear himself from the odium, because you are so big and your ears so gross that you can't hear us when we do speak. However, those prying fellows who are always catching some of us to look at and study, have at last found out the mistake, and his character is entirely cleared.

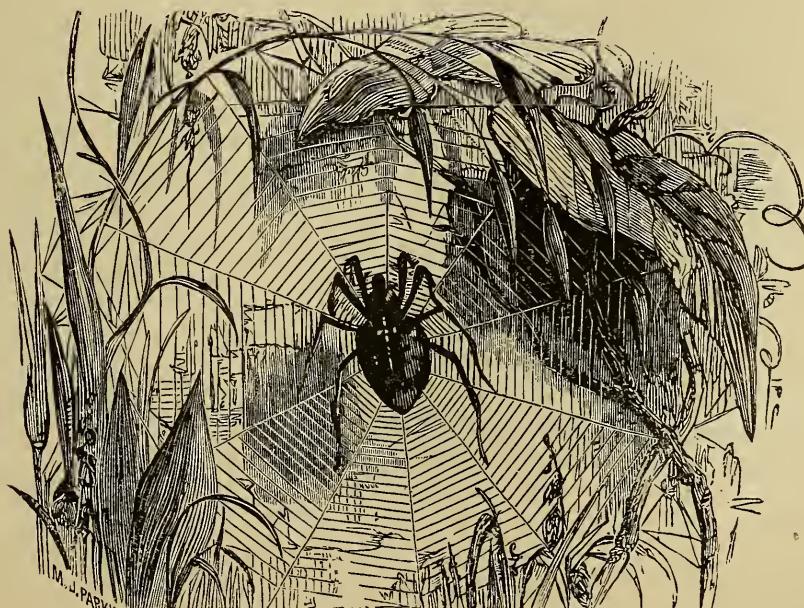
There's one thing you may have noticed about us Spiders, we never go in crowds. Every one for himself, is our motto. Nor do we establish families, like those silly creatures the birds. No indeed!

A Spider mother needs no help in bringing up her babies; and if the father isn't wise enough to get out of her way, she'll—eat him up, and serve him rightly too, I think.

I suppose that with your usual vanity, you think human creatures are the first to go up in the air without wings, but I can tell you, you are very much mistaken. The small members of our family have been in the habit of making excursions into the air, for hundreds of years. They have no clumsy balloons either, they merely get up on some high place, throw out a thread or two till the air will support them, when they let go of earth and sail off as high as they desire. Your books call them Gossamer Spiders.

I'm afraid you would get very tired before I could tell you about half the members of our family. Some of them are very beautiful, with stripes and spots, and some have a hard sort of a shell and are beautiful in another way. Some of them are covered with spines and points and knobs, which give them a very odd appearance, though most of us—as you know—are round and graceful in shape.

There's another thing in which we are peculiar, and different from almost any other live creature—we always rest with our heads down. I never could imagine how anybody could rest a moment with the head held up; it seems so unnatural.



*THE STORY OF A BEAUTY.*

I dare say you have never noticed me, just because I'm a wee bit of a fly, and don't often come out in the glare of day. But if you little people don't see me, wise, gray-headed men, whom you call naturalists—whatever that long name means—admire me very much, and have written a good deal about me, besides naming me Golden Eye.

That's a fine name for one so small, but I have a right to it, for my eye looks like bright gold, and in fact, I'm very beautiful altogether. I don't say this to boast, of course, for I can't help it. I didn't make myself. I was made by the same Creator who made you, and the beauty he gives us is not for us to feel proud of, you know.

And in fact—as to boasting—when I come to tell you my story, you'll find that I havn't much to brag of, in my own conduct.

I came to life—not a beautiful Golden Eye—but an ugly worm. I was fully as ugly as I looked, and all I cared for was to eat. Eat, eat, all day. It did seem to me that I never could get enough. So hungry and fierce I was, that when I could not find any smaller insect, I would fight with my own family and eat them.

But my favorite food was aphides—I suppose you know they are tiny atoms of insects—and when I had eaten their juices, I used to cover myself with their skins till I was entirely hidden by them. This droll covering protected me from my enemies, you know. Well, in this greedy way, doing nothing but eat and grow, I lived a long time, what to you is about two weeks. All of a sudden my hunger left me, and I began to feel very odd. I felt that something strange was going to happen to me, though I knew no more than you what a wonderful change was coming. But I felt that I must have a home at once, so I went to work to make one. Now I can't build, you know, I can only spin; so I made a house of silk, as big as a small pin, and packed myself all snug and tight into it.

Then I went to sleep, at least I don't remember anything till I found myself very uneasy and wild to get out. I burst open my snug house and came out. And behold, I had changed into a beautiful Fly! I stood on a leaf and looked around me, unfolding my wings, and gradually getting used to being a Fly, for you know it was a great change from being a worm.

I found that my new body was a delicate green—just the color of leaves in June, I've heard my admirers say. Then I had four exquisite wings, much longer than my body, changeable green and pink, and so gauzy and thin that I am sometimes called Lacewing Fly.

But my eyes are my greatest beauty, and when I am put into one of those droll things that men call microscopes, you can see them very well, though to your eye alone, they look like specks of gold, as I said before. Through the microscope you can see that they are round and full, like half a marble, and they look as if covered with emeralds and rubies, the colors sparkling and changing all the time.

There's another thing I want to tell you, and that is how my family provide for their children. You know we small mothers never have the pleasure of seeing our own babies. In fact, we generally die before they live. But we are as fond of them as other mothers of theirs, and we are careful to arrange nice, comfortable cradles for the little ones.

None take more pains than we Golden Eyes. We never stick our eggs into some crack, or leave them on the ground, or throw them into the water—by no means! Each tiny atom of an egg has its own white column to stand on, and so is lifted above any dusty leaf or stem.

This is how we fix them. First we hunt up a quiet place for our nursery, where the eggs will not be likely to be disturbed. Then the mother drops a tiny bit of a sort of white gum, which she has packed away in her body, and at once draws it out into a little white stem half an inch long. On the top of this she lays a snow white egg, sticks it with another dab of the gum, and there it is, safe and sound, till the baby breaks out.

We always put a good many of these dainty cradles near together, and men, who think they're so very wise, have often taken home the whole family, examined them, and called them—what do you think? The seed cups of mosses! I must admit

they do look something like mosses, and nobody would suspect a live worm baby was curled up in the tiny white egg.

I have little to complain of in the treatment I have received from men, though the prying naturalists do so delight in putting us into the microscope, and turning a strong light on us. But there's one thing I do feel hurt about, and that is the name these musty book-men have given us. I can't pronounce it—though for that matter I can't pronounce anything—but I've seen it in the big dry books and here it is.

*Chrysopa Vulgaris.*

Now do you think such a delicate, beautiful creature as I am, ought to be loaded down with an ugly name, five times as long as I am myself?

It don't help matters that these words mean something, for if the first one means Golden Eye, I almost *know* the last one means Vulgar.

What would you do about it?

*A CURIOUS DOOR.*

Did you ever see a door in the shape of a half-moon? If you live in the tropics, you've probably seen hundreds of them, and have no desire to make a call on the spiteful little personage who lives there, and who is called a Scorpion.

The two things he specially dislikes, are light and confusion, so, if he is disturbed in his snug, dark house, away down under the ground, he comes out with a vicious snap of the jaws. And if any one is brave enough to touch such a fierce little monster, he is very glad to let him go in a few seconds,—for he stings terribly.

It isn't very easy to catch him, though, for he can run almost like a flash of light, and he will slip into the first hole, or under the first log or pile of leaves he comes to. So fond is he of hiding himself from the light, that he will slip in between bed-clothes, into boots, or gloves, or, in fact, into any snug, dark place he can find.

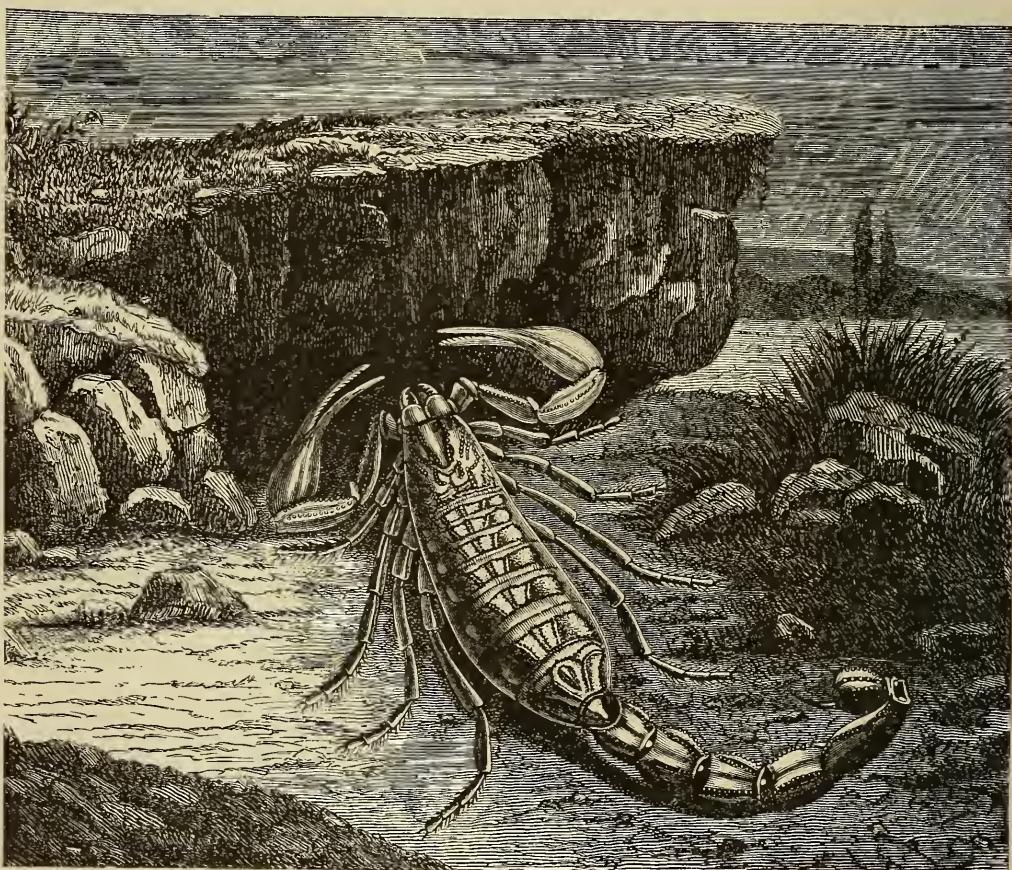
So nicely will he cuddle himself down, that very likely you wouldn't see him till you put your foot into the shoe, or your hand into the glove. Then you would bring it out quick enough, I can tell you.

People who live in hot countries get to be very careful to look for this pugnacious little fellow,—shaking out the bed-clothes, turning over the mattress, and so forth, to be sure not to have so uncomfortable a bed-fellow as Mr. Scorpion is.

When they get too troublesome, men go on a hunt for them. They provide themselves with water and some weapon. When they come to one of the curious half-moon doors, they just pour a little water in. Now, the Scorpion hates water nearly as much as he does sunlight, so, of course, he flies out in a rage, snapping his jaws, and whisking his tail, ready for a fight. The hunter then sticks a spade into the ground, so that he can't get back into his house, and soon puts an end to him.

There's another curious custom of his. So fierce and wild is his spirit, that when he finds himself trapped, when he can't get away from the hated sunlight, he refuses to live, and deliberately commits suicide. This seems hard to believe; but one man who

lived in India, where Scorpions are very numerous, tried the experiment of putting one inside of a circle of fire. The unfortunate little fellow could not endure the light, and could not go through the fire, so, after running about a little, and finding himself a fast prisoner, he deliberately raised his tail—in which is his sting—and stung himself in the back, and died in a few minutes.



This was tried a good many times on different Scorpions, and the plucky little fellows never failed to kill themselves when they found they could not get out.

Disagreeable as they are to us, they have a use, for they eat millions of insects, and eggs of insects and spiders, that would be even more troublesome than the Scorpions.

Mamma Scorpion carries her little ones on her back for several days, till they are able to run about themselves, and she takes care of them for a month. This is very unusual, I want you to know. Most insects leave the little ones to look out for themselves.

The Arab boys catch Scorpions by putting wax on a stick, and running it into the hole in a wall where the animal is. The cross little fellow is sure to run his claws into the wax, but, unfortunately, he can't get them out, so the boy drags him out without trouble.

## YOUR LITTLE SERVANTS.

I don't suppose you know much about your little Servants, who work for you all the long Summer, and never ask a bit of pay. Millions and millions of them there are, and one would suppose that, at least, you would thank them for their work. But instead of that you slander them, and kill them whenever you can.

That isn't because you are bad—it's only because you are ignorant, and don't know how much these little creatures do for you.

You know that when water stands in little pools about houses it gets very bad, and smells awfully, but perhaps you don't know that it sends out gases which give us dreadful fevers. People are very thoughtless, and many such pools are in the back streets of cities. Very soon they would begin to die off with fevers, but there comes a squad of our little Servants, who go speedily to work to make the water harmless.

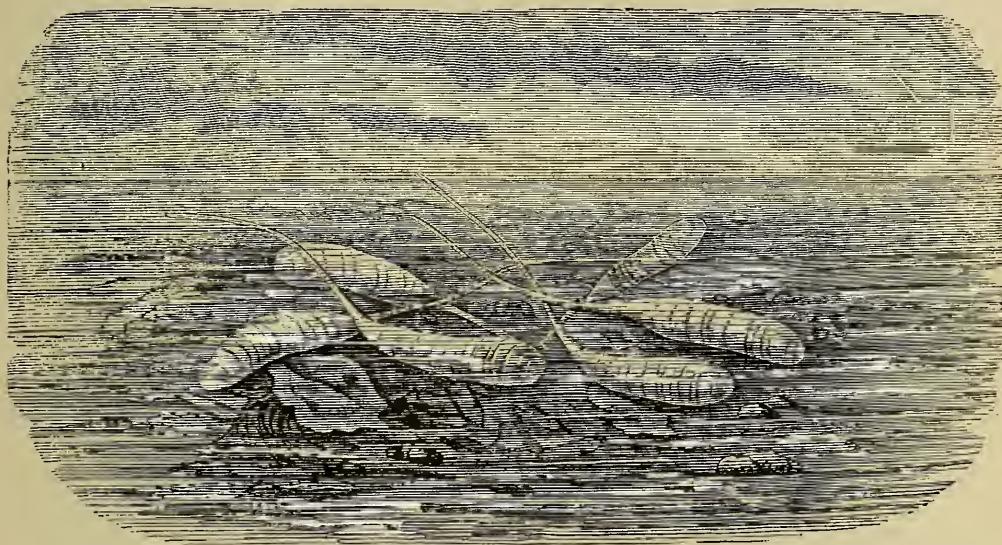
They have a droll way of doing it—they just set their babies to eat it up.

"Horrid!" did you say? Well, it does sound unpleasant, but you must know that the babies like it; they would die in clear sweet water. In fact, they were made on purpose to like it.

The little mothers lay the eggs close by the bad water. The eggs hatch, and the babies—little tiny bits of worms they are—crawl down to the water, and go to work. Now they want to sink deep into the water, while at the same time, they must have air to breathe. So they have a long sort of pipe which they stick up above the water, and the deeper they sink, the longer is the pipe. See them in the picture on opposite page.

There they stay for some time, eating the unhealthy matter, and then they crawl up to a dry place, pull in the pipe till it is all coiled up like a rope. The mother of these industrious babies—I forgot to tell you—is a Fly. Cess-pool Fly, we call her, but the wise books call her *Helophilus*. It's an awful name—isn't it?—but she don't care a snap, she's too busy.

I've told you how insect babies do, eat awhile, and then wrap themselves up in some tight cover and stay there in the dark till their wings grow, and they come out of their houses regular insects like their mothers. Well, these babies do just the same, of course,



and come out Cess-pool Flies, ready to set *their* babies to work on the first pool they find.

Cess-pools are not the only bad places. There are the sewers, filled with all the drainage of the city. Many would die from the bad odors from them, but for another little servant, the Sewer Fly. She is so hairy she looks something like a bee, and she lives in the sewers.

You needn't pity her—she likes it—that's what she was made for.

I suppose people who live in cities, have no servants—little or big—who do so much good as these two little Flies.

There's another one though, that is very busy, and you've probably seen her, for she finds her babies food in our pantries and cellars, and she is none of your quiet little workers. She bustles around with a loud buzz. Her work is to remove bad meat, and almost before you know there is danger to our meat, she finds it out and puts her family to work at once. She has several names;

the common one is Blow Fly, and of course, she has an imposing name in italics, which means *Vigilant Flesh Fly*.

There's one curious thing about her. She doesn't lay her eggs like other flies, and trouble herself no more about them! She has in her broad gray and black body a roll of eggs. I can't tell how many, some naturalists say one hundred thousand. Well, fifteen or thirty of these eggs drop into a sort of bag, still in her body, and are hatched there. So when Madame Blow Fly finds a piece of naughty meat, she just puts her live hungry babies on it, and proceeds to hatch out more, while she is hunting a dinner for them. She only lives till she has hatched out all the eggs—three or four weeks.

One branch of the army of servants busies itself in burying dead animals, such as birds, mice, or toads. Did you ever wonder why you never find a dead bird in the woods? It's all owing to these industrious little servants, the Burying Beetles. They dig a hole under the dead creature, and when it is sunk low enough, they lay their eggs in it, and cover it up. On the opposite page is a picture of them; they are burying a dead rat.

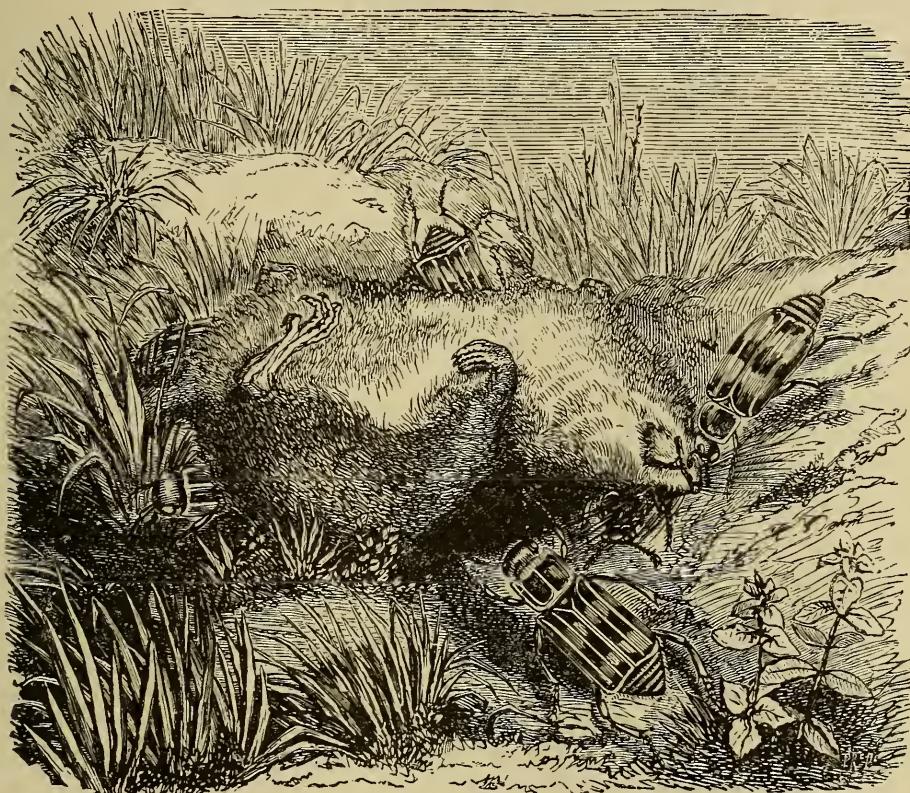
So thorough are they, that nothing can escape them. Once, a naturalist that I read of, wanted to dry the body of a toad. He stuck it up on a stick to get it out of the way of these little fellows. But they were not discouraged, they dug around the stick till it fell down, and then buried the toad, stick and all.

Among the busiest of these little workers are the Ants. In hot countries where there are a great many of them, nothing can escape them. Anything that is dead, animal or vegetable, is at once devoured. And they don't wait for small animals to be dead either, they just attack live ones.

Perhaps you have heard of one kind called Chasseur Ants, of the West Indies. They travel in regular armies, of uncounted millions, and destroy every live creature small enough for them to overpower. In that hot climate there are many insects that infest houses. Besides rats and mice and flies, as we have, there are cockroaches, wasps, scorpions, snakes and dozens of other creatures. Well, when these Ants enter a town, the people open every drawer and box and leave the house.

The Ants go through everything. Kill and carry off every creature in the house. They are regarded as very valuable scavengers, as indeed, they are.

Other Ants have in charge decaying vegetable matter, and that is no light task in that country, where huge trees die and fall on the ground. The land would be covered with ruin, instead of



the luxuriant flowers and foliage everywhere to be seen. When a tree falls, one kind of insect attacks the bark, and others bore millions of holes in the wood. Then when the rain and sun begin to make it decay, others come and feed on it, and in a few months the enormous tree is all gone, and young trees and plants come up in its place.

Mosquitoes—tormenting little fellows as they are—belong to this army of servants. Their little ones help to keep stagnant water pure, and undoubtedly prevent a good deal of sickness. So the next time one comes singing about you, you must reflect that it is better to endure a bite or two, than to have the whole family sick with fever.

We certainly must include in our scavenger army, the insects that eat other insects, and thus prevent them from becoming so numerous as to devour every plant in the world, as they would, if every egg hatched. These servants have different ways of getting their food. Some of them hunt it as men hunt deer. The Spider —you all know—prepares most wonderful nets, to trap her game, and so far from feeling disgust towards her, we ought to cherish her carefully. Why, what kind of a life would we have, if the thousands of Spiders around us did not thin out the ranks of the flies. I almost believe we would be eaten up. I'm sure I'd rather have my garden half full of Spiders' webs with their quiet mind-their-own-business inhabitants, than to have the armies of impudent, buzzing, tormenting flies, that not only get into your food, and spoil every pretty thing in the house, but bite the baby and torment your life out of you.

Besides spiders, we have reason to be tender of Wasps and Hornets, for though they sometimes sting you when you disturb them, they destroy millions of flies, and other insects. I have even heard of people having Hornets in their houses, to eat up the flies.

The most beautiful of our servants, are the Birds. They almost live on insects that destroy our vegetables and fruit. Whenever a farmer has taken pains to destroy Birds that disturbed his fruit, he has found the insects increase so much as to destroy everything. Even Sparrows, that have been so awfully slandered, destroy great quantities of caterpillars. One man who studied into their ways, says a pair of Sparrows with little ones to feed, will destroy three or four thousand caterpillars in a week.

*A HUNDRED BLACK BABIES.*

You think that must be a funny sight? Well, it is, and the funniest of it is, that they're all found in one nursery, about as big as an egg.

I'm afraid you'll never see it though, for even if you were small enough to go through the long passages and many rooms the careful Mamma builds, before you got to the nursery, you'd be sure to meet that same Mamma, in some narrow passage, and you'd find her quite ready to fight you. And though she's nothing but a poor little Mole Cricket, you'd find her very formidable if you were small enough to enter her house.

This little Cricket—see her in the picture, with her nice snug home where she has left hundreds of eggs—always lives out in damp grounds, by rivers, where she burrows out her curious house, and is cousin to those you have heard chirping around the hearth in country houses. She has various names. In some places it is Churr Worm, in others Croaker, and in still others Earth Crab.

The house Crickets prefer to burrow into the mortar between bricks, and live by the fire, where their cheerful chirp is very pleasant to hear. In fact, in some places—Spain for instance—they are so much liked that they are kept in cages.

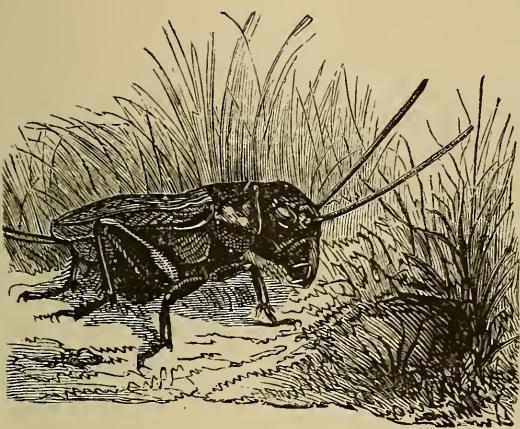
I don't suppose you ever heard that these funny little black fellows, belong to the same family as the grasshoppers and locusts, and that they also have four wings. And more than that, they have five bright yellow eyes, two large and three small ones. I think it must be that they can see too well, for they don't like the light at all, and always run to their holes if one is brought into the room.

They are very fond of water, and will even eat up damp clothes if they get a chance. Sometimes they seem to get tired of living in one house, or perhaps they catch the moving mania from the people they live with. At any rate, whatever the reason, they will suddenly desert a house, going off in crowds to find a new home.

There have been many superstitions about the innocent little fellows. Many think they bring good luck to a house, and others think they can tell what is going to happen in a family. (If they can, I never heard of their telling anybody.)



The Field Cricket is another of the family, that lives in holes in every garden or field. He's too much afraid of men to live on the hearth. In some things though, he's a droll creature.



He is very pugnacious, and in France, boys catch him, by sticking a straw or bit of grass into his hole. He will come raging out, and is easily caught. Perhaps he is too much surprised to resist. Here is a picture of him.

Their greatest delight is to sit in their doors and sing, which they do all through the Summer. Each one lives by himself, and I'm sorry to say they are very quarrelsome, and

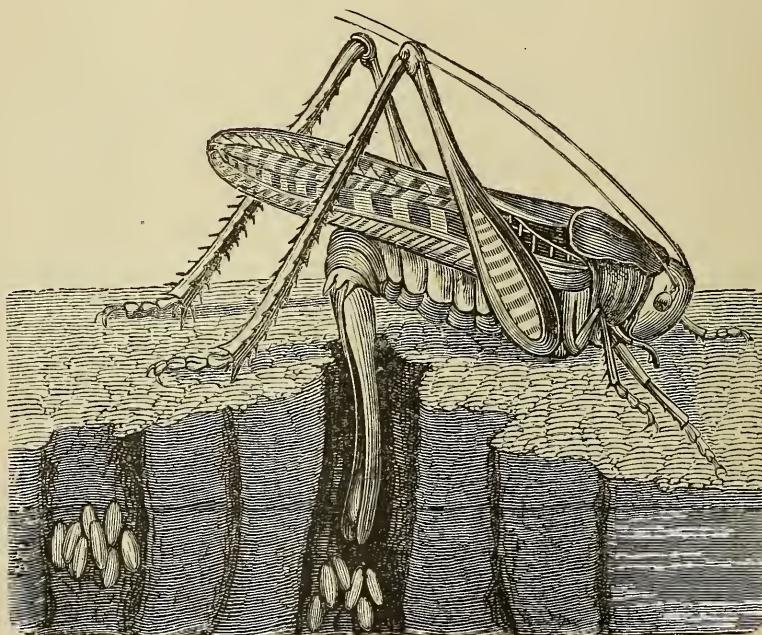
defend their houses by very hard battles. Their fighting is no joke either, small and harmless as they seem. They have strong jaws and sharp fangs, and know how to use them.

If you wish to enjoy the music of a Field Cricket in your house, it is said that you can keep them alive and happy in a paper box, if you put plants in it, and keep them well wet, for you must be sure and remember that they're like some children I've seen, always wanting a "drink o' water."

You might like to hear them, but I suspect your Mamma would prefer to hear it out of doors, for after all, it isn't particularly musical.

*A LONG-LEGGED FELLOW THAT CAN'T WALK.*

No, indeed—not a step—his legs are too long! That seems a funny reason, doesn't it? But look at the one in the picture, and see if you think such tremendous legs as the hind ones—those that stick up like elbows—could ever be made to walk. You recognize the creature, I'm sure, and you know well enough that it don't want to walk, it would feel disgraced to have walking suggested. It is the grandest of hoppers, and can get over the ground faster than most walkers.



The picture is of the variety of Grasshopper called the Wart-biter, because some people think its bite a cure for warts. It shows the mother of the family arranging the nursery, and carefully depositing the babies—all safely wrapped up in egg-shells—so that the Grasshopper family may not fail next Summer. See what a

wonderful instrument she has for the purpose. When closed up it is just the sort of a tool with which to bore into the ground to prepare the nurseries, in the first place, and when open it makes a safe and handy sort of tube for the egg to slip down. When she has ten or twelve—or about that number—placed in one snug room, she will pass on and make another. In that way, she is sure that not all her babies will be destroyed, even if one of her nurseries is discovered and robbed. She will not be satisfied till she has laid about seventy eggs, and then she will go off into the grass, ready to die when the time comes, and leave her babies for the next Summer's sun to hatch out. When the babies come out of the shell, they are about as big as a tiny ant, but they grow very fast, throw off their old skins very often, and before long, come out as big as their mother.

Grasshoppers are known in the books by a Greek name, which means "Murmurer," because of the noise they are so fond of making. The finest one of the family is the Great Green Grasshopper, who wears a suit of delicate light green, and is two inches long. He scorns to live in the grass, and passes his time in the trees, where he eats leaves. This little fellow is chiefly celebrated—among naturalists—for the beautiful structure of his gizzard. It has beautiful rows of teeth, arranged in bands, for the purpose of cutting up the pieces of leaf that the Grasshopper swallows. That would be a convenient arrangement for some young people I have seen, who swallow their food almost without chewing.

Now I want to tell you about some cousins of the Grasshoppers, who do not pass their lives in innocent hopping around the fields, paying for the small mischief they do by their pleasant, cheerful call. These relatives are the Locusts, and are a most dreadful pest to the country, coming in such clouds that they eat everything green before them. In hot countries they are common, and every means has been taken to be rid of them. In Asia and Africa their numbers are almost incredible; they are so thick as to make almost total darkness, and they settle on the ground several inches thick, breaking down heavy branches of trees by their weight, and leaving the country as bare of green behind them, as though a fire had passed over it.

One column of these insects was five hundred miles long, and so wide that it made the country almost totally dark where it passed. That was in India. I have read of whole armies being absolutely

broken in disorder by their coming like a live hail-storm into the soldiers' faces.

The young ones are just as bad, or worse. They have no wings to fly, and, therefore, are called foot-goers ; but they are even more hungry than the older ones. They advance in crowds several inches deep, and nothing can stop them. If a fire is built, they actually smother it out with their bodies, and into a stream they plunge in such numbers, that those that are drowned soon make a bridge for the rest to go over. And the dead soon infect the air, making it intolerable to go near them.

There have been many ways tried to get rid of them. One is by eating them up,—though I don't know as any one ever seriously hoped to destroy them in that way. Fires are built when they are seen coming, and those that fall into them, or lose their wings by them, fall to the ground, and are gathered by the people. They are good fried, or dried and crushed to powder and baked in cakes. Camels, and all animals, are fond of them. They are dried and salted, and sold in the markets in Asia. In some places they are gathered in great bags, early in the morning, before the sun is hot (for they cannot move in the cold), and carried off, a droll bag full of buzzing, to be deprived of their wings and legs, dried, and put away for Winter.

The Negroes of Soudan try to frighten them away by savage yells, and in some places guns are used.

In the Middle Ages, Locusts were solemnly exorcised by the priests. They formed processions, and went out and spoke to the creatures, catching some, so as to be sure of an audience, and then letting them go to tell their friends.

Unfortunately, the pious monk who tells this story, neglects to tell what effect all this had on the Locusts.

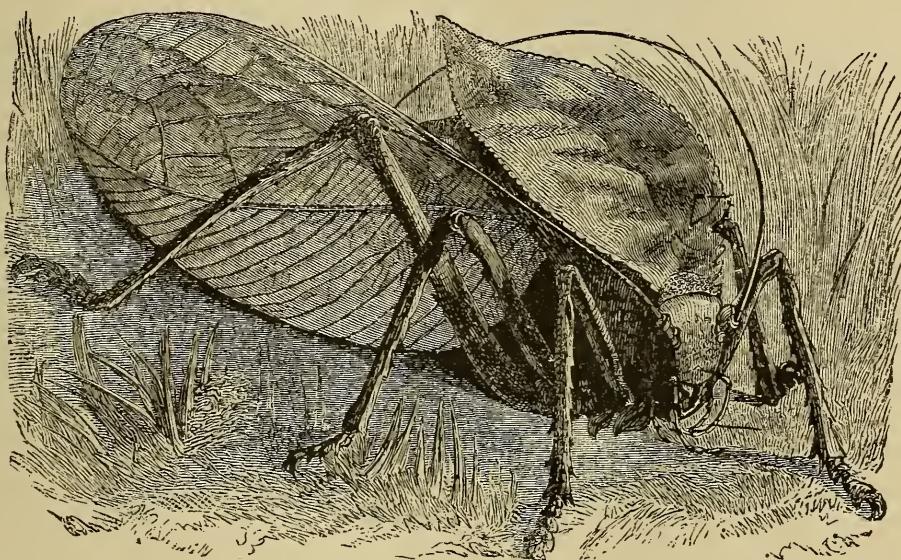
The Arabs have other ways. According to one writer, the Prophet read what is inscribed on the wings of a Locust, in this way : "We are the troops of the Most High God ; we each one lay ninety-nine eggs. If we were to lay a hundred, we should devastate the world." On reading this, Mahomet was very much frightened, and prayed to God to destroy these dreadful creatures. Since that time, words of prayer to the Prophet, written on paper and put into a reed, which is planted in a field, will turn away the Locusts. So say the Arabs.

Another way is to catch four Locusts, write on the wings of

each, a verse from the Koran, and let them go. That is sure to drive them away.

The only way that the rest of the world finds of any use, is to wait for a storm, which invariably kills the whole of them. Mr. Wood says that after a severe storm, a bank of dead Locusts has been seen three or four feet high, and fifty miles long.

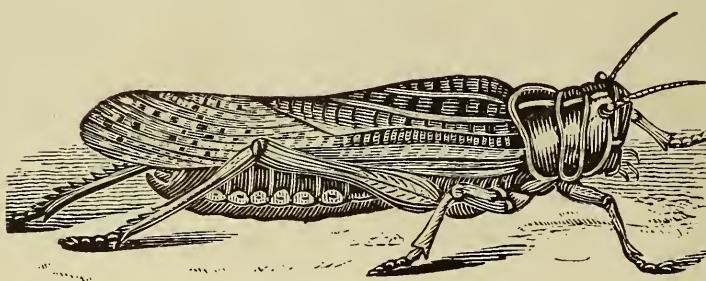
In many countries the Government pays for all eggs of the Locust that the people will bring. And in others, the people are obliged to pay their taxes with so many pounds of Locust eggs.

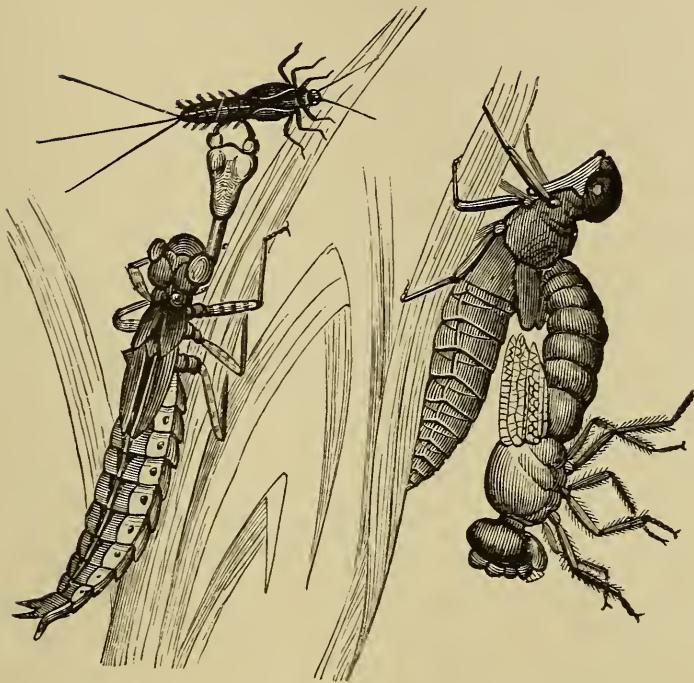


Here's the picture of another Grasshopper I want to tell you about, which has been found in New Guinea. It is called the Great Shielded Grasshopper, and a strange fellow he is. He is not a very lively creature; but he does not need speed, for he looks so much like the leaves that no one would suspect him to be an insect.

In the first place, his wings—which are more than nine inches across when open—are exactly like two green leaves, beautifully veined like a genuine leaf, and of the shining green color of many tropical leaves. Then over the back, beginning at the top of the head, he carries what appears to be another leaf, and from which he is named. It is two inches and a half long, of a stiff, horny

consistency. The edges are notched like a leaf, and there is a faint line through the middle, like a leaf. In fact, you may almost put your hand on him before you find out that he isn't a little bunch of three leaves, but a big Grasshopper.





### THE LITTLE MASKER.

This strange personage—whose picture you see here—begins life at the bottom of a pond, in the shape of the left hand figure. His name, in the big books is—is—as long as he is, and not half so pretty, so we'll leave it there.

He always wears a mask; indeed, he would not know how to live without it, for it is in his possession when he first finds himself in the world, and he never parts with it for an instant till—but wait, I haven't got to that yet.

The name you know him by is Dragon Fly, or Devil's Darning Needle, or Horse Stinger. Dragon Fly is a suitable name, for no Dragon ever was a greater monster to eat than this same fellow. But the other names are simply ridiculous, for he could not sting if he tried, and as for sewing up your ears—as country children say he will—it is too absurd to deny.

However, all this is when he has grown up to be a Dragon Fly. He begins—as I said—a curious little fellow with six legs and no wings, and his home is at the bottom of a pond, where he lives for many months doing nothing but hunt other insects and eating them up. And now you'll see how useful is his mask. When in its place, folded back against his head, it seems to be a sort of lower lip, but let him catch sight of a fat grub, or anything nice, and out darts the mask like a long arm—nearly as long as his whole body—as you see in the picture—seizes the unhappy prey in a pair of pincers at the end of the mask, and jerks back to the head, bringing the desired morsel to his greedy little mouth, where it soon disappears. He does the whole so quickly, that it looks to one who sees it, as though the victim had jumped into his mouth himself.

Now isn't that a useful mask, and don't you suppose he's a horrid monster to the other little six legged fellows who live in that pond?

His mask isn't the only odd thing about him, his way of breathing is fully as curious. This is how he does it. From the end of his tail a tube passes into his body. He draws the water through this tube till it reaches the breathing organs, when the air is breathed and the water is thrown out again. Of course he keeps this up all the time—as you draw air into your lungs through your nose—and the water is sometimes thrown out with a jerk that sends him three or four inches along in the water. So when he wants to swim, he has only to breathe hard—you may say.

As he grows older, he throws off his skin now and then, after the fashion of these curious little fellows, and when he throws it off for the last time, a sort of a hump makes its appearance on his back, (which hump contains the future wings,) and his head is larger and broader.

But there comes a day when even this greedy little creature cannot eat. He can hardly breathe too, and for the first time in his life, he feels inclined to get into the air. He climbs up a weed till he gets out of water, and then swings back and forth, till—wonderful to tell—his skin splits open on the back, and he finds himself a full grown Dragon Fly.

He isn't very gay at first however, for he is not used to breathing the air without any water, as he must now. So he rests awhile till he gets used to that, and then he begins to wiggle himself out of his old shell. Look at the figure on the right, and see him at it. When

he gets entirely out—leaving his old skin hanging on to the weed—he begins to unfold his wings, for you know they were packed into a very small place. He takes long breaths, and shakes out fold after fold in the wings, till at last they are fully spread out, the beautiful great gauzy things that you have seen ; and the perfect Dragon Fly darts off into the air for something to eat. For in spite of all his changes, he has not lost his dreadful appetite. He needs no mask now, for he can dart about as fast as any creature, and flies, spiders, and centipedes, and anything else that he can catch, make food for him.

Mr. Wood says that if you hold a Dragon Fly by his wings—and do not hurt him—he will eat almost any number of insects you can give him, and when you let him go he will fly off after more, as hungry as though he had been starved.

You have seen for yourself, no doubt, the beautiful colors in which this little creature is dressed ; the rich blue, deep green, and bright red, and above all, the splendid great clusters of eyes on the head, and the delicate gauzy wings which carry him so rapidly backward as well as forward, through the air.

In the Malay Islands, this beautiful creature is hunted for the table ! It would not be easy for you to catch enough of them to eat, but it is very easily done by boys in those Islands. They provide themselves with small branches, strip off the leaves, leaving a few twigs at the end. These they cover with bird lime—the very stickiest stuff you ever saw—and start out on the river banks, where Dragon Flies are thick. They only need to move their sticks about in the air, for every unhappy fly which they touch, is instantly caught. The boys pick them off the sticks, pull off their wings, and drop them helpless into a basket. When they have enough, they go home, and the unfortunate Dragon Flies are fried in oil with onions, and end their career on the supper table.

It is no more than fair, to be sure, that creatures who have spent their lives in eating other live insects, should at last themselves be eaten, but I don't want to punish them for their greediness in that way, do you ?

One of the Dragon Flies is so pretty and graceful that it is called the Demoiselle Dragon Fly. Of this family the ladies dress in delicate green throughout, while the gentlemen on the contrary prefer a dark blue, spotted with black.

*THE LITTLE HUNTER.*

A fierce little fellow he is, too, and as wary and wise in his way, as any of the big hunters you read of who set traps, dig pitfalls, spread nets, or follow up with a gun.

He's a very slow fellow to get about ; indeed, some people say he can't go any way except backwards, and he'd starve to death if he depended on his speed, especially as his favorite food consists of ants—about as lively little fellows as I know of. But the little hunter is far too wise to lose his dinner by expecting to catch it on the run. He sets a trap—that is to say, he digs a deep pit, with steep sides, and when it is done, he buries himself at the bottom of it, with only his jaws sticking out. See him in the picture. There he waits for his game, and he has not long to wait either, for generally in a few minutes some thoughtless little fellow, hunting for food, looks over the edge of the pit to see if possibly some nice bit of meat might be there. He sees no meat, but the slippery sand begins to roll out from under his feet, and before he knows it he finds himself at the bottom of the pit, and in the jaws of the cunning hunter. So, instead of finding his own dinner, he becomes a dinner for his enemy.

This hunter is a droll little fellow, and though he has a perfectly monstrous name, with no less than twenty letters in it, he isn't so big as the end of your little finger, and when you come to know the meaning of his long name, that isn't so very big either—only Ant Lion. You see him at the left of the picture.

Though a short name, it is rather a high-sounding one for a fat little grub not half an inch long, isn't it? But I assure you he deserves it, for no lion ever was more terrible to man, than this tiny bit of a grub is to the ants and other small creatures on which it feeds.

There are several curious things about him, besides his way of getting his dinner. To begin with, though he has six legs, like all insects, they are all very weak, and not of much use to him, excepting the two hind ones, with which he drags himself about backwards, as I said. Think of going backwards all your life!

Another odd thing, is the way he makes his pit. He selects a sandy plane, as free from stones as possible, and then proceeds to make the pit by dragging himself around in a circle, and throwing the sand out with his flat head, which makes a very good shovel. When he gets around once, he goes on to make a second ring, inside of the first, a little deeper, and so he goes on, making his circle smaller and deeper, till it is done, and he has taken his place under the loose sand at the bottom. Ants are his usual prey—as I said—but he will not refuse other food, and if a small beetle, or

unwary spider chances to fall into his pit, it will meet just as warm a reception as the ant, in fact, warmer, for the spider or beetle is not so easily conquered, but fights for its life. He will struggle and try to climb the slippery sides, thus bringing down quantities of the sand, but the Ant Lion all the time throws it out with that useful head of his, often hitting the struggler with a shower of sand and bringing him back to the bottom.

Some writers say that the cunning little fellow deliberately throws the sand at his enemy, to bring him down, but I believe it is not generally thought that he is so wise as that.

When the battle is over and the Ant Lion has sucked all the juices out of his victim, he takes the empty carcass on his head, gives it a jerk, and throws it out of the pit, so far off—as much as six inches—as not to have any suspicious looking bones around to frighten the next timid ant that comes along. But after a hard fight the pit is apt to be injured, the sides are half pulled in, and in fact, the particular little fellow don't feel at all satisfied to stay in it. He never fixes up the old pit, but always goes to a new place and digs a new one.

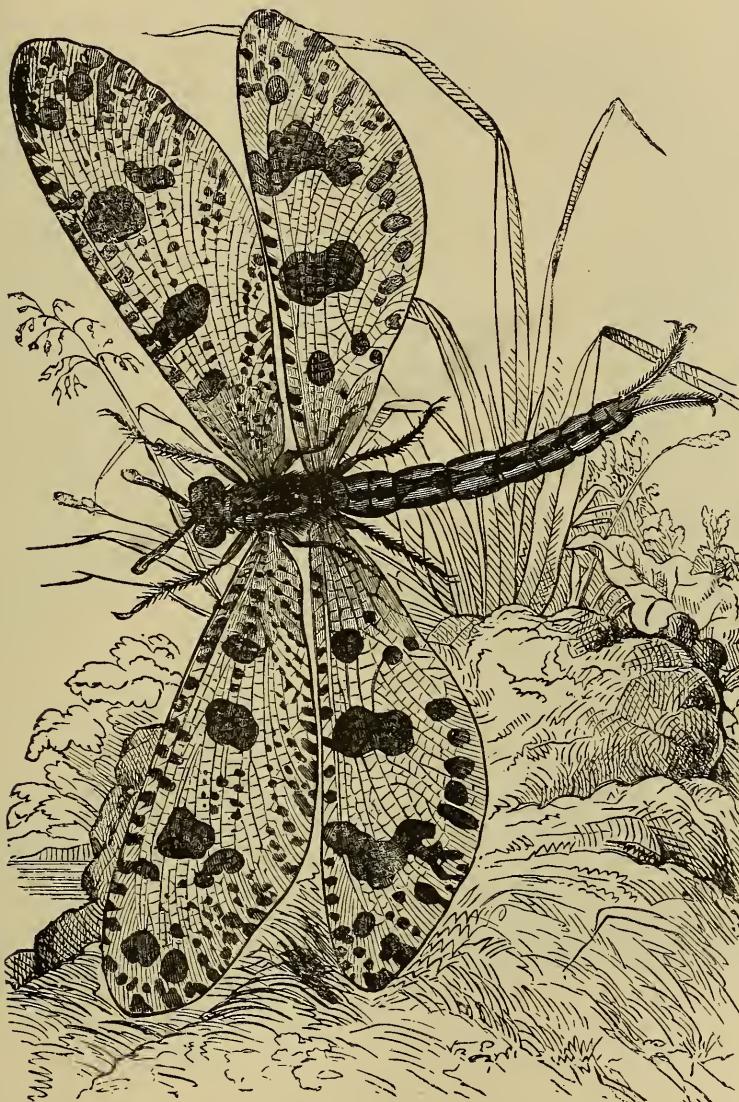
The Ant Lion is not a very pretty fellow ; in fact, he looks more like a fat spider with short legs, than anything else. His body is round and covered with little tufts of black hair.

You'll hardly believe me when I tell you he is a sort of relative of the elegant dragon fly, that I told you about ; but don't be in haste to decide. I have only told you about the first part of his life, and you know insects have three shapes before they get through the world.

When the Ant Lion has eaten as many ants as he wants, and begins to feel stupid and sleepy, he goes to work to build himself a snug house, where he can pass the second state of his wonderful life, and not be himself eaten by some bigger insect. This house is called his cocoon, and is made of fine sand glued together with silken threads which he spins himself.

This silk and sand house is less than half an inch in diameter and is round. Inside it is lined with silk, and there he passes a quiet season of rest after his hard labors as an Ant Lion. When ready to come out, he gnaws a hole through the house and draws himself out. But what a change has come over him ! When he has taken a breath or two of air, his body suddenly grows three times as large as it was in the cocoon, four broad gauzy wings

unfold, the curious antennæ unroll, and he floats off on the air a beautiful fly, exactly as you see him at the top of the picture.



Here's another Ant Lion, the beauty of the family; you can see his larva in the first picture, at the right. It is larger than the other, you see. This kind does not make a pit, and this is his natural size.

*THE HOUSE BUILDER.*

And a tremendous house it is, too. Look at it hanging down from that branch, with its owner half out of the door. It is built of scraps of mud and leaves, bound together by silk threads.

So fond is the Caterpillar of its house that it sometimes spends the whole of its life in it. It is very convenient, for it is so light it

is no burden to carry it, and he can shut himself in so snugly that his enemies can't get him.

When this creature stops feeding and prepares for its change, like all others, it shuts up the door of the house, goes far back into its house, throws off its last Caterpillar skin, and stays there till it is a perfect moth. Then, if it is a male, it creeps out and flies off, but if a female, it never leaves the house.

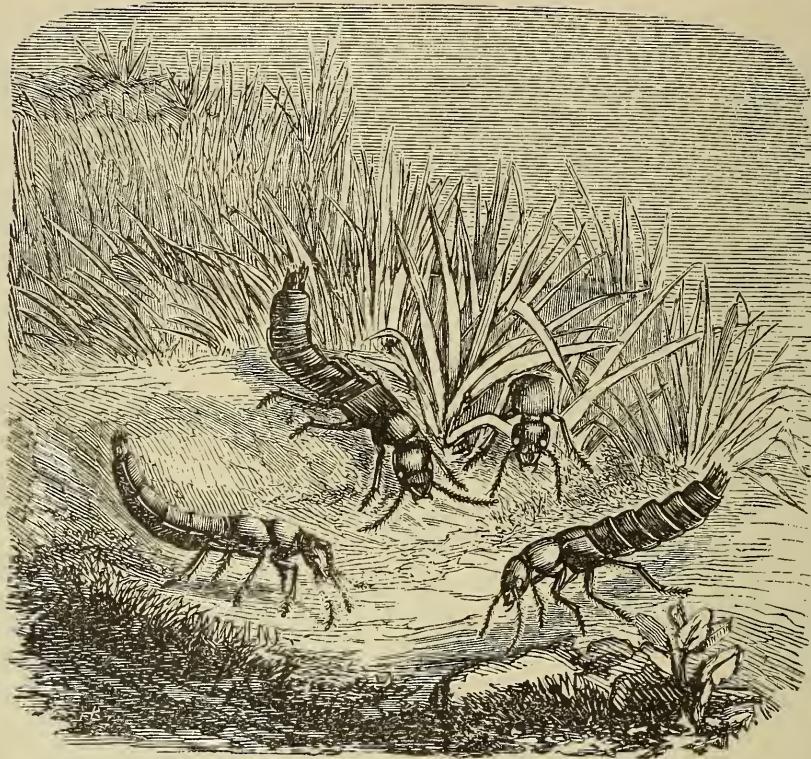
In fact this poor creature is rather strangely treated, considering how her Mother flies off. She has no wings, and mere apologies for legs. She looks like an ugly grub. There she stays till the day of her death.

The other side of the picture—the right side—shows a pleasanter picture. It is the Altas Moth, and you see him flying off. Up in the corner are the cocoons it makes—pretty little silk things, like a silk-worm's cocoon.

See what a pretty fellow the Moth is. His colors are not glaring, being cream color and brown, but the tints are so soft, and so beautifully blended, and the plumage is so soft, and his wings so large, that he is very pretty in spite of his sober colors.

The finest of this family are found in the Tropics, and in these, the antennæ are beautifully feathered, and shaped like a spear head.

One of this family lives in North America, and builds its cocoon in the Sassafras tree. It is placed in the leaf, and fastened to it, but for fear the leaf should fall before the Moth could escape, the stem of the leaf is fastened by silk threads to the branch.



### THE DEVIL'S COACH HORSE.

That's a very curious name for a little fellow not more than an inch long, but it is the name given to those four curious creatures you see in the picture, who seem to be having a sociable visit together.

Mr. Wood says this is the ugliest insect in England. Its color is black, its eyes have a particularly ugly expression, and it has a fashion of holding its tail up as though it would like to sting, like a scorpion. But worse than all, is a horrible odor that comes from it, and which—added to its ugly look—makes people very willing to keep out of its way. Indeed, its scientific name, *Olens*, means a bad smelling object, though some writers have given it another name, meaning mournful, on account of its black dress.

But it is not entirely bad. In the first place it is very brave; it is not afraid of anything, even of a man. Mr. Wood tells a story about meeting one in his walks. He threatened it with a stick, but the Beetle flew at the stick with his mouth open, as though he was going to annihilate the whole thing—stick, man and all. Mr. W. struck the stick down hard very near him, but he was not a bit frightened; he fought every inch of the way.

He is a very lively fellow; he flies and runs with equal speed, and one of his scientific names means swift-footed.

The eggs in this family are very large for the size of the Beetle, being a tenth of an inch long. When they are hatched out, the young Coach Horses are just as ugly as their parents, but have no wings. Their only business in life seems to be to eat. They are very fierce, and will kill and eat every creature that is not too large for them, even their own kind.

They do not need to set a trap, or dig a pit, like the little Hunter I have just told you about; they are swift enough to catch anything, and they have a quick way to kill their prey, seizing them in the neck, and biting them, and never letting go their hold till the victim is dead, and the juices sucked out.

When the time comes, that comes to all insects, when they can no longer eat, and only want to get out of sight in some safe place, this little fellow digs a hole in the ground and buries himself there.

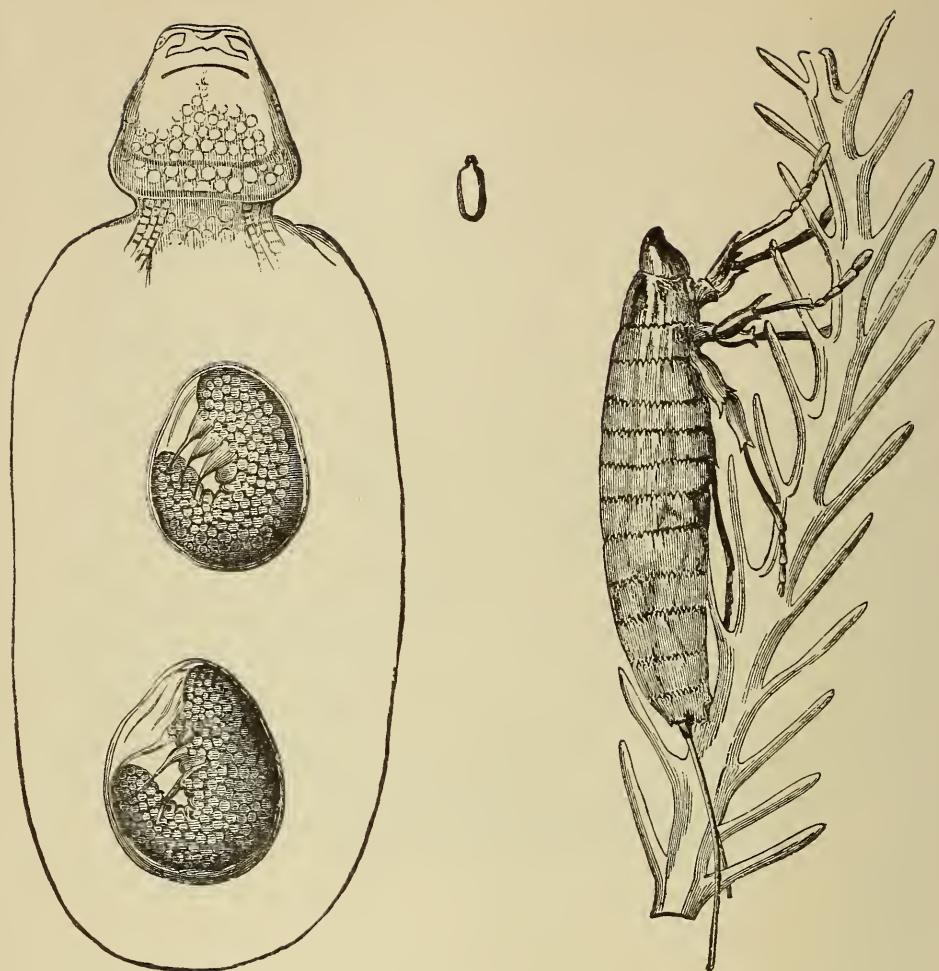
After two or three weeks, he crawls out, a perfect Devil's Coach Horse, like its parents, and is ready at once to start on its new life.

Disagreeable as the creature is in appearance, it is really useful to the gardener, for it cares not for vegetable food, but kills and eats hundreds of the insects which *do* eat up the fruit and crops of the garden.

Here is another Beetle that I want to tell you about.

Fine interesting creature is a Stylops; did you ever hear of it? I don't think you ever did, for the whole creature, big as he looks in the picture, is really not much larger than a small letter *i* on this page, and the branch which it is crawling upon, is one of the hairs of a bee. You have to thank the microscope for making it large enough for you to see.

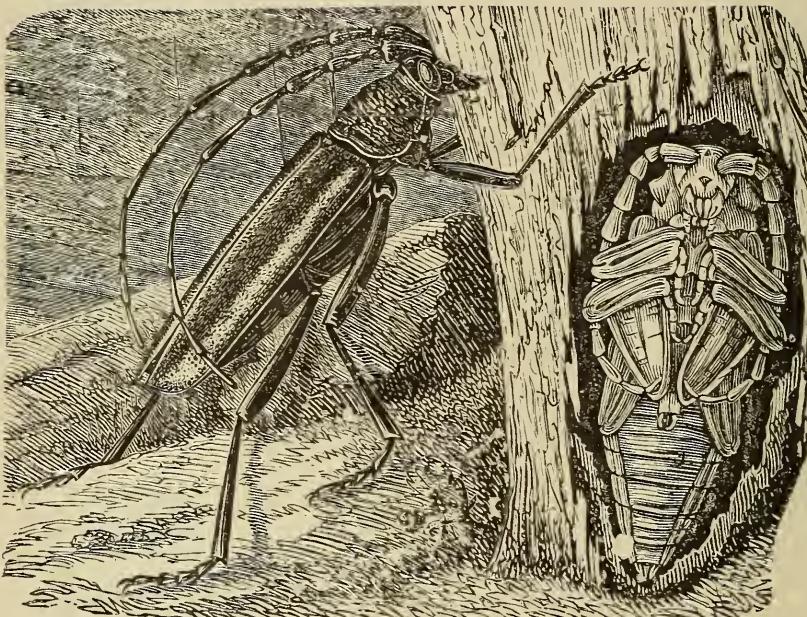
The whole family live on the body of an unfortunate bee. The mother of the family—that bottle-shaped object on the left of the



picture—is blind and without legs, and she passes her life nearly buried in the soft parts of the bee.

The young, like the one on the right of the picture, cling, as I said, to the hairs of the bee, and when she goes to her nest it gets on to the bee baby. It does not kill that unfortunate creature, because it is so small, but it feeds on it, and sticks to it, through all its changes till it becomes a full grown bee. It goes through the regular insect changes on the back of the bee, and at last, if it is a male Stylops, it grows a pair of wings and flies off, and if it is a female it only buries its body in the body of the bee, and settles itself for life. When the young are born, they seek other bee babies to grow upon, and the mother Stylops soon dies.

Is not that a strange and wonderful history, of such a tiny atom of a Beetle as this? Think of the patience and carefulness of the man who found this dot of a creature buried in the body of a common bee, got it out, put it into a microscope and studied it, so as to be able to give its whole history. How many dozens of the small creatures they must have caught and studied before they found out all the things that I've told you in a few minutes!



### WHO'S THAT KNOCKING AT THE DOOR?

Do you see this elegant gentleman in brown, coming to pay a visit—apparently—to his folded up and laid away relation in the tree trunk? This is Mr. *Cerambyx*, and he belongs to the family of the Longicorn Beetles, because of those two graceful horns which he wears on his head. The droll looking personage in the cozy little nest in the tree, is only the same fellow before he had his wings, in his changing time, when he ceases to be a fat worm, and is growing to be a beautiful Beetle.

Perhaps you think the inside of a tree trunk a curious place for this little fellow to live, but it is the most natural place in the world, for he's a most famous wood borer. When he was a white worm he spent his whole time boring holes into trees, and of course, when the time to hide away in the dark came to him, there was no place so nice as one of the little rooms he had hollowed

out. So there he is. Do you see his long horns folded over, and his legs most grown? This white worm had no legs to speak of—at least they were so small that they were of no use. But he had a pair of jaws to make up, and indeed he needed a strong pair to bore into wood.

There are a great many kinds of these long horned Beetles. One of the most interesting, is the Musk Beetle, which gives out a most delightful smell of musk, or some say of otto of roses. The odor is so strong that he is often smelt before he is seen, and if he is held a few minutes in a handkerchief, he scents it up strongly.

He's a very pretty fellow, too; his dress is of brilliant green, looking in some lights, blue and gold, and his shape is slender and elegant. Unlike most of these little creatures, the Musk Beetle can make a noise, from which he is sometimes called a Squeaker. The sound is not made with the mouth, but by jerking the head up and down, and thus rubbing one part of his hard shelly covering against another.

Some of this Longicorn family have perfectly monstrous horns—five or six times as long as they are—and how they can get about with these things to carry, and not break them off, I can't see.

In the Malay Islands, an English naturalist—Mr. Wallace—found more than a hundred varieties of the long horned gentry; some very beautiful, and all strange creatures.

*A FEW MORE BEETLES.*

Here is the picture of the Stag Beetle. The first curled up individual in the left lower corner, is Mr. Stag Beetle as he appears in his grub state. The next uncomfortable looking bundle of an



object, is the same personage when he has come to his full growth as a grub, and become what is called a pupa—or chrysalis. Both of these are represented as being in the ground, because they do pass their lives in seclusion, though naturalists of late, affirm that this particular family always lives in the wood of trees. Outside, at the top of the picture, you see Mr. Stag Beetle himself, with his tremendous horns, and his modest wife without any. I'm sure she needs none. One such pair of horns must be enough for any one family.

To begin with the grub—since that is the beginning of his life. The Stag Beetle Grub is a fat white worm, with six legs, to be sure, but so feeble and weak that it is said he cannot get about on them at all. He lives in trees, and eats the wood which he bites off with his strong teeth. He prefers the oak tree, but will accept a home in a willow, though some naturalists say that he never acquires so great a size when living in the willow.

In this snug house he lives two or three years, till he has got his growth, for this family—the insect family, I mean—never grows except in its grub state. During all this time he has been throwing off skin after skin, as he got too big for the old one, till he has attained his full size, when he stops eating, and changes into a hard cased bundle—like the picture. There he neither eats nor moves, but lies apparently dead, while the strange change goes on from a fat unwieldy worm, to a lively flying Beetle.

When everything is ready, the hard skin of the pupa splits open, and out comes the perfect Beetle—wings, horns, legs and all—ready to run and fly and eat, and live his little life. He gets his name of Stag Beetle, from the shape of his horns—or, to speak more properly, the shape of his jaws—which are somewhat like the horns of a stag. He is sometimes called a Hornbug. He is often three inches long, and a furious looking fellow he is, too. If you attempt to catch him you will find him as fierce as he looks, for those terrible jaws of his are as strong as they are large, and you will be sure to be badly bitten. Even after the fierce little fellow's head is cut off, the jaws will bite of themselves.

Madame Stag Beetle, too, meek as she looks, is a desperate biter, even worse than her husband. Her jaws, though short, are very sharp and strong, and she thinks nothing of making them meet in your finger. One would suppose that such a pugnacious family must live on their neighbors, they have such convenient weapons with which to kill them. But you can't always judge by appearances, you know. The Stag Beetle family live on the juices of twigs and fruit, and their sharp jaws are used to crush the twig to get their food. If you succeed in catching one and wish to keep it alive, you can feed it on moistened sugar, which it laps or sweeps up with a sort of brush which it has in its mouth.

Some observers say that it does now and then attack insects, though whether to drive them away or to eat them, does not appear. They have been seen coming down from a tree carrying a

caterpillar in their jaws, but what was the fate of the unhappy creature is not told.

They can be tamed. One man had one which would follow him anywhere, when he offered it honey. They only fly about in the evening.

The grub of this Beetle is supposed to be the kind which was a favorite dish among the ancient Romans—curious taste those old fellows must have had.

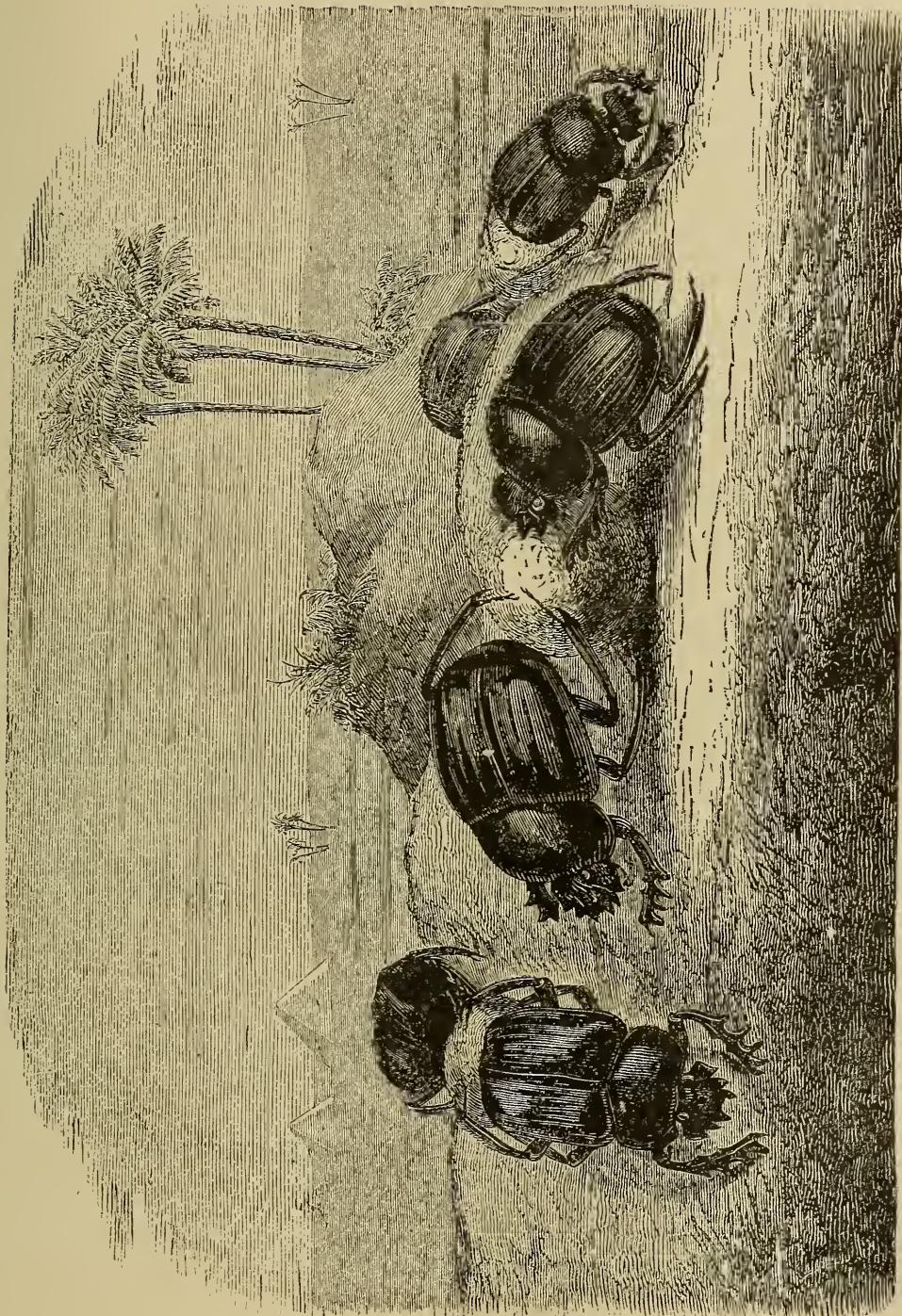
On the opposite page, is another interesting creature, no less a personage than the Sacred Beetle of the Egyptians. It is often seen painted and cut in stone, among the works of that ancient race. It is about an inch long, and not a great beauty, as you see. In fact, there is nothing specially wonderful or interesting about it, except the way in which it provides for the comfort of its babies. It is a hard working and very useful little creature, so we must respect and admire it for these qualities. The life business of this little Beetle, is to dispose of, and put out of sight, disagreeable substances that would make the very air unpleasant in some parts of the world, and this he does in the curious manner you see in the picture, by making it into balls and burying it.

This is the way it goes to work. The smelling organs, or some other organs, of the Beetle are very keen, and no sooner does it become aware of a disagreeable substance, than it goes to work digging a hole in the ground near by. When this is done, the insect returns to the desired object, makes of it a ball, and proceeds to roll this ball about in the dirt, till it is rather hard on the outside, and has a coating of dust. I should have mentioned that before the ball is started, an egg is placed in it.

When it is rolled long enough, the industrious little worker pushes it into the hole which is ready for it, and covers it up with dirt. In due time the egg hatches out, the young grub eats up the food provided by its mother, and comes out—after awhile—a perfect Beetle itself.

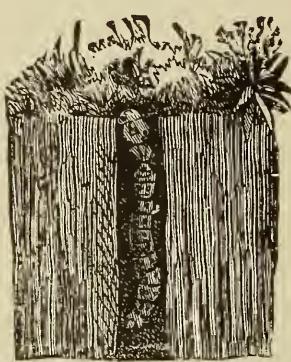
We have one of this family of Beetles in our country—and more than one, for all I know. Its popular name is the Tumble Bug, and I dare say you have often seen it, rolling its balls about in the road. This work is done by the hind legs, and the creature looks as though it was standing on its head.

There's one good thing about these little Beetles. Although they work in the most disagreeable of substances, they are always



perfectly clean themselves. Their coat is as shiny, and their legs as smooth and clean as though they lived in cotton and fed on honey.

The little fellow, whose life is pictured here, has a very large name—the Tiger Beetle. But he fully deserves it, for innocent and



harmless as he looks, he is one of the fiercest and most cruel of Beetles.

He begins life—like the rest of the Beetles—a fat grub, about half an inch long. He is by no means a beauty, having a broad flat head, and a pair of hooks on the back, by means of which he climbs up his curious house. His house itself is merely a deep hole in the ground, which the grub makes for itself, in this way. With his jaws and fore legs he digs a little earth and piles it on his flat head. He then climbs to his door, and throws the dirt off. He sometimes makes his hole a foot deep.

When he is hungry—and he generally *is* hungry—he climbs to the door of his house, fixes his two hooks in the side so that he can't fall, and there waits with open mouth for some unwary insect to come along, as you see in the picture. When he succeeds in seizing one, he retires to the bottom of the hole to eat him. Naturalists find it very hard to catch this fierce little grub, for the moment he is disturbed he drops to the bottom of the house, and stays there till he thinks he is safe. There is one way of getting him out, however. If a straw or small stick is thrust down the hole, he will attack it at once, and hold on to it till he is fairly dragged out of his house.

When he changes into a Beetle, he is a beautiful creature. He is golden green with yellow spots on the back, and beautiful blue on the under side. He is so bright and beautiful when flying through the air, that he is called Sparkler Beetle.

He is a very fast runner, and as swift a flyer. He chases his prey either on wings or legs, and rarely fails to catch it. Once caught in his fierce jaws there is no help for it, it is instantly torn to pieces, legs and wings thrown away, and its juices sucked out by the well-named Tiger Beetle.

It is under the microscope that this furious little fellow shows to the best advantage. There he blazes out into wonderful beauty. Just hear what a wise man—Mr. Wood—says about him :

“The groundwork of its upper surface seems to be burnished and encrusted thickly with emeralds, sapphires, diamonds and rubies of unspeakable brightness, and it blazes out with such gorgeous brilliancy that the eye can scarcely endure the glory of it.”

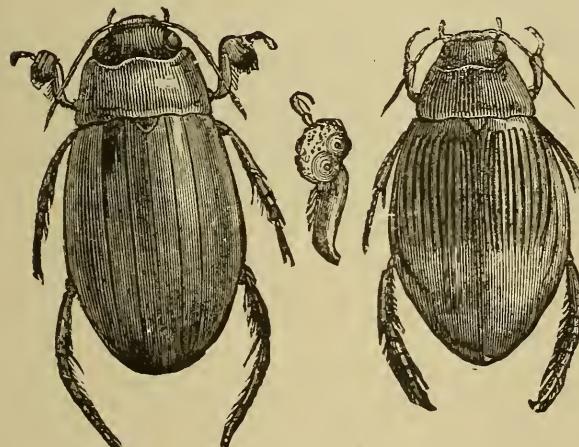
The Tiger Beetle gives out a pleasant scent, like sweet briar. Here's another fellow that might be called a Tiger Beetle, only he

lives in the water, and receives the name of Shark. He will eat everything, even his own brothers. It seems, indeed, as if he never could get enough to eat, and after devouring everything in his own pond —tadpoles, small mollusks, young fish, and insects—he will fly off to a fresh pond for more food.

The picture shows Mr. and Mrs. *Dyticus* (that's

the lovely name the books give them), and the fore legs of Mr. *Dyticus* magnified to show their curious form. The other legs are flattened like oars, and the Beetle can't walk very well with them, since they are made to swim with. The curious fore leg is furnished with suckers like those in the arms of a cuttle fish.

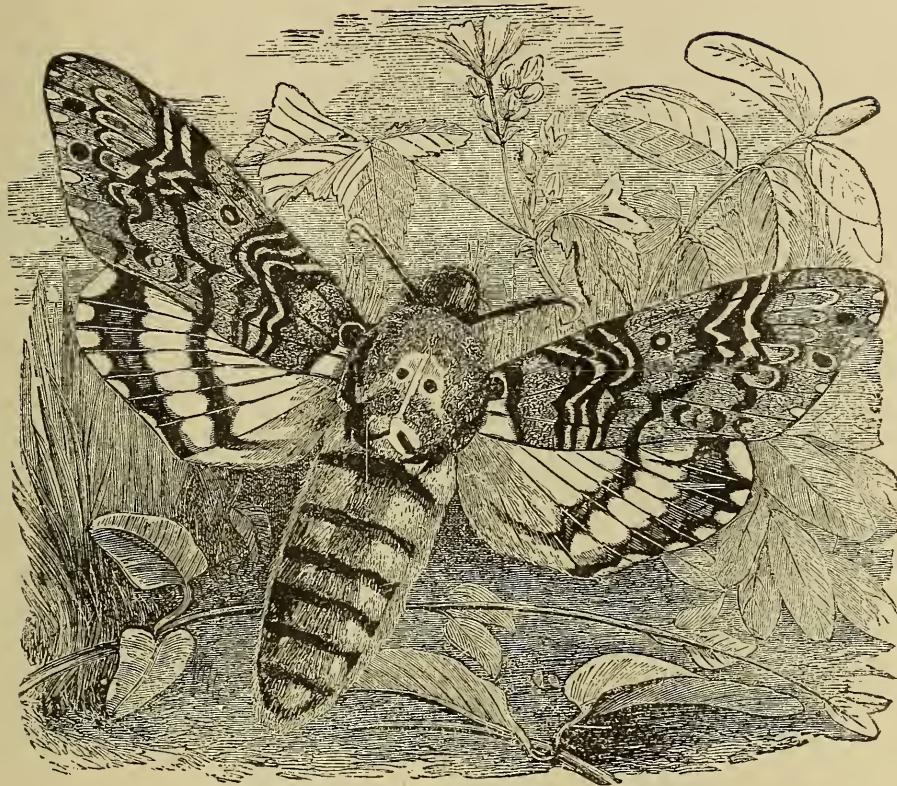
Perhaps you think this Beetle is not very beautiful, but if you could see him as he was when a grub, you would think him much improved. He was about two inches long, about the color of



yellowish mud, with large sharp, curved jaws. These jaws were hollow, so that when he had seized his prey with them, he could suck up their juices through them.

When this ferocious fellow got his growth, he crawled out of the water and made a hole in the ground, where he stayed till he came out a perfect Beetle.

The *Dyticus* lives in the water of ponds and rivers, but at night he takes to his wings and flies about in the air. When he comes back to the water, he has a curious habit of closing his wings and dropping into the water, but this habit sometimes gets him into trouble, for he has been known to mistake glass for water, and so come bump on to the top of a greenhouse, which must have astonished him very much.

*AN OBJECT OF TERROR.*

Yes, this Moth—innocent and harmless as he looks, and as he is, too—has long been an object of terror to the ignorant, merely because of the curious marks he has on his back. These marks look like a skull with the crossed bones under it, and the innocent Moth is regarded as the messenger of pestilence or trouble of some sort, and it has thrown a whole country into consternation. Some people have even believed it was a witch, and that it had the terrible habit of whispering into the ear of human witches the name of any person who was going to die.

All this is, of course, perfectly absurd. The Moth is far more harmless than the beetles I have been telling you about, and though

he can make a noise when caught—which is unusual for Moths—that proves nothing against him.

Mr. Wood tells an amusing story about seeing one of these poor little creatures near a village church. The people were gathering around, and no one dared to come near it, till the blacksmith—braver than the rest—gave a tremendous jump, and crushed it with his boots. Mr. Wood preserved the flattened Moth as an example of popular ignorance.

The Death's-head Moth is very large, sometimes spreading its wings nearly six inches, and it is dressed in sober black and brown, with yellow lower wings. The antennæ, or feelers, are very stout, and have hooks on the end, as you can see, and are covered with long soft hair. It belongs to a family called Hawk Moths, because of their swift flight.

But I must tell you about this Moth before he came out with wings. He was a big fat Caterpillar, perhaps five inches long, of a bright yellow color striped with green, and covered with tiny black dots. There is a picture of him on next page.

At the end of his body, is a sort of a horn, you see. He feeds upon potato plants in general, though he could eat other plants. But both the Caterpillar and the Moth feed only at night, and hide during the day, so it is difficult, even for a professional Moth hunter, to find them.

When the Caterpillar is ready to stop eating and become a pupa, he burrows into the ground, and stays there till ready to come out a Moth.

Another Moth that I want to tell you about, is the Goat Moth, called so because it has a strong odor, something like that given out by the goat. It is soberly dressed in different shades of brown, and it is not particularly remarkable, except in its grub state. The eggs of this Moth are always put deep into some crevice, in the bark of a tree, and as soon as it hatches out, the young grub proceeds at once to bore into the tree. Here they spend four years, eating and boring all the time.

As the grub grows larger, the tunnel he makes gets larger also, and many a tree has been killed by the destructive little fellow. He's not so little either, after he is grown; sometimes he is three inches long, and as large as a man's finger. His head is wedge-shaped, and he has very powerful jaws. Naturalists—who like to keep these creatures and study out their ways—have a great deal

of trouble in keeping this Caterpillar. He will eat his way out of wooden boxes, of course, and tin boxes need their covers tied on,



for he has a way of pushing his head around the edge till he gradually gets it open, and if a crack can be found in tin or zinc, he will take the edge in his jaws and twist it open.

When full grown, he makes for himself a snug home of bits of wood held together by silk threads which he spins. The cocoon is oval, and yellow in color. Before he is ready to come out, he pushes himself, through his burrow till he reaches the entrance, and when he crawls out, a Moth, he leaves the old shell in the door to his house.

There is a Moth called the Ghost Moth, from a curious habit he has. He is bright silvery white on the upper part of his wings, while the under part is a dull brown. He has the habit of hovering about in one spot a long time, of course showing his white wings very plainly in the dark—which is the time for Moths, you know—

but if he is disturbed he will drop into the grass, or hang on a twig, in such a way as to show only the brown side of his wings. Of course that cannot be seen, so he seems to have vanished. If the observer keeps watch, he will see him again soon, in about the same spot, and white and ghost-like as ever.

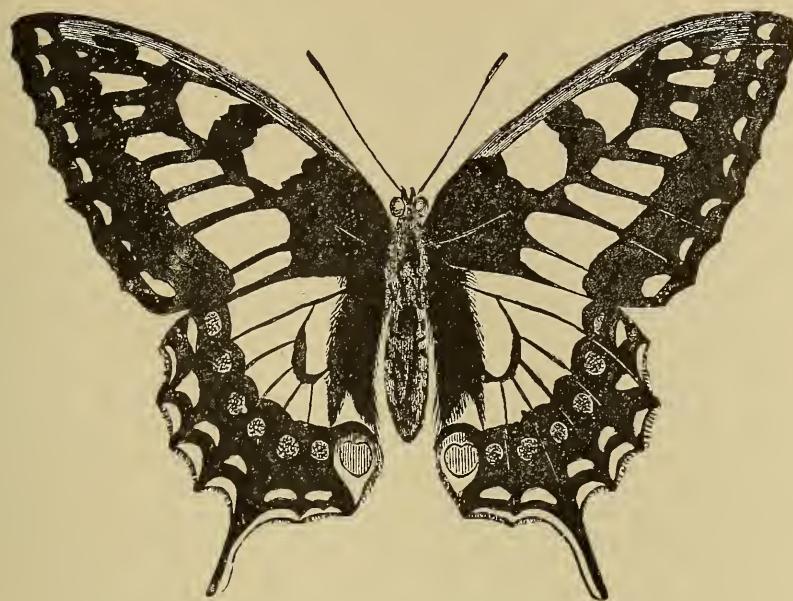
Many people have been very much frightened by this innocent little creature.

If any of my readers have a fancy for making collections of Moths and other night-flying creatures, they may like to know how to catch them. It is by a process familiar to naturalists, and called "sugaring."

First, some common sugar is boiled in water, or beer, and corked up for use. Choose a dark, calm evening, pour some of the mixture into a basin, add a few spoonfuls of rum, (Moths are not temperance men, you see) and soak some pieces of cloth in it. When thoroughly saturated, take them out, drain them off, and start out.

Provide yourself with some small boxes, a butterfly net, pins, a small bottle of chloroform, and a lantern. Go where there are plenty of trees, and pin the strips of cloth on to the trunks of the trees. The odor of rum and sugar will soon attract the Moths from all directions, and turning the light of the lantern on to the rags, you will soon see plenty of them. You have only to select which you want, catch them with the net, kill them with a drop or two of chloroform, pin them into your boxes, and go on. When you have enough, take down your rags, and save them till you want them again.

But the bodies of Moths are so large, they do not keep well, but shrink in drying, so if you want a really handsome array, you must stuff them. That seems funny to talk about, but it is not hard to do. Carefully cut off the abdomen of the Moth, and take out all its contents through the small hole at the end. Then stuff it with cotton wool, adding a drop or two of benzole, which will keep off insects. When it is dried, you can join it to the rest of the creature so that it will not show.



*SCALE-WINGED.*

Did you know that Butterflies are scale-winged—that is, that their wings are covered with little scales, which lap over each other like shingles on the roof of a house? Beautiful scales they are, too, of various shapes and most wonderfully painted with all the exquisite shades of color you can imagine.

But you cannot see half their beauty, unless you can look through a microscope.

There's another wonderful thing about a Butterfly, and that is its trunk. To you—with the naked eye—it looks like a little thread coiled up at the end, when not in use; but examined with a glass, it proves to be a perfect and beautiful contrivance for sucking up the juices of flowers. One French naturalist watched the living Butterfly feed himself from a lump of sugar, through a glass, and thus saw just how it was done. First, the little fellow would send down from his mouth some liquid, which seemed to dissolve the sugar, and then he would suck up the dissolved fluids into his mouth. Thus he could eat sugar, and thick honey and syrup, which he could not get through his dainty little tubes otherwise.

But the trunk is not the only beauty about him; he has lovely eyes, and so many of them that it's no wonder he is hard to catch. They are what are called compound eyes, and our little Butterfly

will sometimes have as many as thirty-two thousand of them. He needs all he has, however, for he has hosts of enemies, swifter to fly than he is—such as birds, and dragon-flies—and if he did not have eyes looking every way, he would stand little chance for his life.

Another help to the Butterfly is his zigzag sort of flight. Birds who fly after him are constantly dodged, and thus he gets away. I have somewhere read an account of a bird chasing one Butterfly about for a long time, utterly unable to catch it, yet evidently very much astonished at his failure.

Another safety for the Butterfly is the color of his wings. However gaudy the outside may be, you will notice that the inside or underside of the wings is generally of a duller color. Now, when a Butterfly is at rest, he holds his two wings (four wings rather) up over his back, nearly touching each other, so, of course, the bright side is hidden, and the dull colors on the underside harmonize with the tree on which he rests, and he is almost invisible.

The picture at the head of this article is the Swallow-tailed Butterfly. He gets his name from the long sort of tails which you see on his second pair of wings. He is a great beauty, yellow and black, with six cloudy-blue spots on the lower wings, and a large red spot at the end of those.

When Mamma Swallow-tail, or Mrs. *Papilio Machaon* (which is her book name, you must know), gets ready to provide for the next generation, she lays a quantity of light-green eggs, fastening them on to some twig or plant with a sort of sticky gum, and leaves them to their fate. In due time, the green eggs grow black, the shells burst, and out come the small Caterpillars. Their first business is to eat, and they begin on the shell they have just come out of, and as they go on and grow, and throw off one skin after another, they never fail to eat up the old garment. Think of eating up one's old clothes!

The Caterpillar with that curious habit is a beauty, and perhaps you have seen it. It lives on fennel, or parsley, or carrot leaves. It is of a beautiful green color, with black bands around its body, and on the bands beautiful yellow spots.

Here he is, as he looks when he is full grown, done feeding, and about to turn into a chrysalis; and on the right hand side of the same twig you can see how he looks when he is in that bundled-up state.

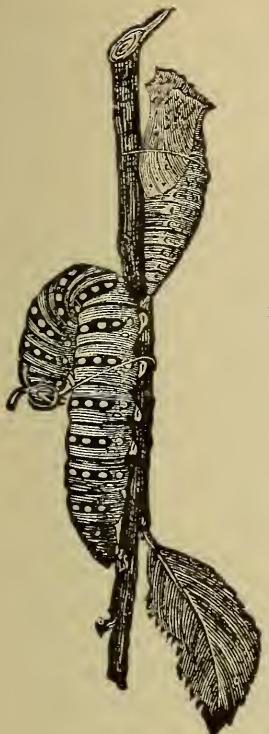
You see he is engaged in binding himself on to the twig, which he does in such a nice way that all through his chrysalis life he is safe from falling.

I spoke of Butterflies feeding on honey, but there are some of them which live on quite a different diet. There is the Purple Emperor Butterfly, a most beautiful creature, of a rich purple—almost black—ornamented with white. This elegant insect prefers the juices of bad meat to all the flowers of the garden. If he can find a dead dog or cat lying about, he has a great feast. It isn't very pleasant to think of, is it? But something must be done with such objects, and this beautiful Butterfly does his share.

Naturalists take advantage of this strange taste to catch the beautiful creature.

They look for an open place in the woods, and set a trap for Mr. Butterfly, consisting of a piece of unpleasant-smelling meat; or rather they set several traps, laying down a dozen or more pieces—some ways apart, of course. In a short time the hunter comes back, and if the weather is favorable, and there are any Purple Emperors about, he will be apt to find one or two on every piece.

I told you about some superstitions regarding Moths, and now I must tell you of the terror caused by an innocent little Butterfly of the *Vanessa* family. When it leaves the pupa—or chrysalis skin—a red-colored liquid, looking exactly like blood, drops from it. The ignorant people, seeing these drops, have been very much terrified, and accounts of several such “showers of blood” have been related by historians. But on one occasion, when the people of a certain town in France were nearly frightened out of their wits by such a sign, a learned man, seeking into its cause, discovered the facts about this Butterfly. He noticed that multitudes of them were flying about, so he collected some of the chrysalides and let them hatch in a box, and finding the same drops of blood, he made it public. But, of course, though entirely explained, the ignorant people could not be cured of their terror.



*A CRUSTY FAMILY.*

Funny looking fellows they are, too, tip-toeing around on the hill in the moonlight, with their eyes set up like buttons, and their claws brandishing in the air. Perhaps I do not need to tell you that they are Crabs, and of the sort called Land Crabs, because

they live on land, and dig houses for themselves in the ground. They are sociable fellows, and live in what you may call villages. They are terrible creatures to bite, and can run like race horses ; in fact, many horses cannot overtake them. But they are very nice to eat, and of course, are much hunted.

They do not come out in the day time, but sleep all day in their holes and come out at night for their food. If any one comes near them, they will hurry back to their homes, but if actually caught, whether by leg or claw, they will instantly jerk off the leg which is a prisoner, and run off on those they have left. The loss of a leg is nothing to these fellows, for it will soon grow again.

Crabs—even Land Crabs—all go to the sea to leave their eggs to be hatched, and when that time comes, they travel in great crowds, turning aside for nothing they can get over. Some time during the Summer, about August, is the time when the Land Crab family throw off their old shells and come out in new ones. As the time draws near, each one retires to his own house, where he has already made a bed of grass, closes the door in some way, and there he stays, drawing himself out of his old clothes, and waiting till the new suit hardens on his back. In this soft condition they are very much desired for the table, and are called on the bills “Soft-Shelled Crabs.”

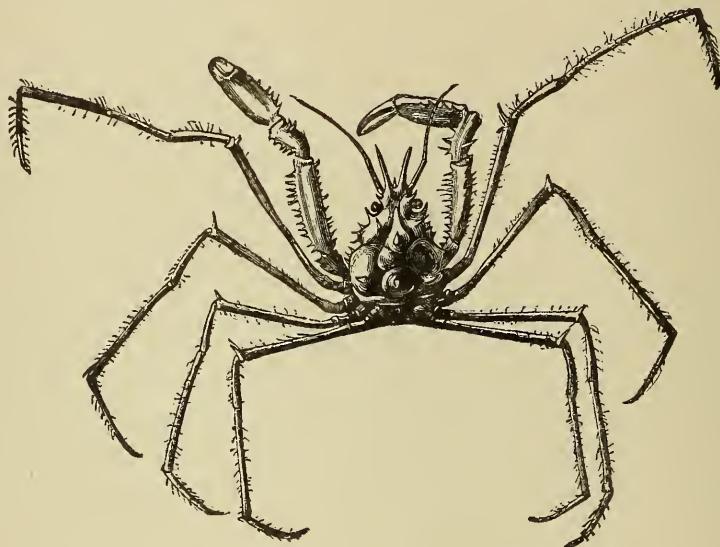
I called them a crusty family, and there are two good reasons for the name. One is, that they are really very quarrelsome fellows, and the other, that they are named *Crustacea* in the big books, because of the hard shelly crust that covers them. One branch of the family is also called *Stalk-eyed Crustaceas*, because their eyes are set up on the end of a sort of stalk. Some of these odd stalks are as long as the Crab himself—as though your eyes were in your hand—and when he raises them up to look about him, it is a comical sight, I assure you.

One of the most curious of the Land Crabs is called the Robber Crab. He lives in the Islands of the Indian Ocean, and eats scarcely anything but cocoa-nuts. I’m sure you’ll think he has good taste. But how do you suppose a Crab would go to work to get the meat out of the hard shell of the nut? There are two different stories of the way the Robber Crab gets his food, and both told by trustworthy men; so we have to believe that both are true. One story says, that the Crab tears off the fibres covering the nut, digs out the eyes—those soft places in one end of the

nut—and works his claw around in the hole, till he digs out the meat. Another story says that after peeling off the husk, he gets his claw into one of the eyes, and beats the nut on a stone till it breaks.

This Crab is more than two feet long, and when walking about on his toes, like the common Crabs in the picture, he is a foot from the ground. He makes a home for himself by digging a hole under the roots of the cocoa-nut tree, lining it with cocoanut husks, and filling a convenient store-room with nuts laid away for winter.

But here is a very different sort of a Crab, not much like those I have been telling about. See what a delicate body he has, and what long legs.



He is a slim Sea Crab, and he runs about on the bottom of the sea.

There are many kinds of Sea Crabs, and very droll fellows they are, too. Many of them hide themselves under perfect loads of sponge, and other sea things, and a specimen is shown in the British Museum of one on which were fastened several oysters—actually growing on the Crab's back.

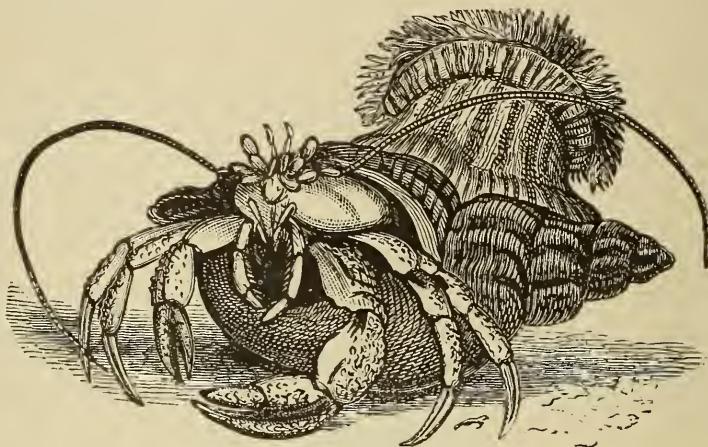
Besides the Running Crabs there are the Swimming Crabs, who have the last pair of feet made flat, and the last joint spread out like an oar blade, so that they can swim as well as a fish. Like all

the rest of the Crab family, they are fierce and voracious, hunting their prey through the water, and eating everything that has life, nearly. Such greedy fellows they are, that they eat each other as readily as anybody else. A small Crab has no chance for his life when a larger one gets after him. They seem to have very little feeling, however. One naturalist tells about seeing a small Crab busily engaged with his dinner, when a larger one came up, and commenced dining off him. He went on with the greatest coolness, devouring his own prey, while his big brother was eating him.

Crabs eat with their claws, as if they were hands, tearing their food to pieces and putting it in their mouths, and it is said to be a very droll sight. Mr. Wood tells of one common British Crab, whose special business it is to act as scavenger on the coast. Everything that is thrown into the sea, like bad fish, he will attend to at once, tearing it in bits and eating it. But the strangest thing about it is this, in pulling his food off, of course thousands of small particles are left floating around too small for the claw of the Crab, so he is accompanied by a whole family of sea creatures, who have established their home on his back and legs—actually fastened there and living on him—and whose mouths are always open to catch the floating particles. Twenty or thirty thousand of them there are sometimes. I suppose some instinct tells them that wherever that greedy fellow goes will always be plenty to eat, and so they take life passage with him.

Perhaps the very oddest of this odd family is the Hermit Crab. He is called Hermit because he always lives alone. But the strange thing about him is, that nature has not provided him with a strong shelly house, like the rest of the Crab family, but has left him to find his own. This he does by hunting up some discarded shell, generally of the spiral sort, and taking possession of it. When he settles himself, it is for life—at least, till he grows too big for this house—so he is very particular to have it just the right size, and not too heavy for him to drag around. When he finds one to suit, he goes in tail first, and takes a strong grasp with his two last legs, which nature—having denied him a house of his own—has made very handy for this purpose. Once in, it is impossible to get him out; he will let himself be torn apart before he will give up. In fact, he can draw himself so far back into his house that you can't get hold of him to pull him out.

He's a famous fighter. He will fight for a piece of meat, or for a desirable shell. In fact, a Hermit Crab who secures a particularly nice house, goes through life fighting to keep possession of it. To see one of these fellows fitting himself to a shell is funny enough. He's as particular as a woman hiring a house. He tries it in every way—holding it off to see if it is too large, going in to see if it is big enough. When he is suited, he whisks into it, and then he is settled.



Here he is in his house. Do you see that curious looking thing on his shell, that looks like a short piece of a column with a fringe around the top? Well, that is another animal, that is very fond of living on the shell of a Hermit Crab. It is called the *Cloak Anemone*, and though it can live on a stone, it prefers to ride about. Mr. Gosse—an English naturalist, who has studied these little creatures very carefully—says that the *Cloak Anemone* may almost always be found on a Hermit's shell. He thinks, too, that the Hermit is fond of his companion, for he has seen one, when he grew too large for his shell, and fitted himself with a new one, carefully take off the *anemone* from the old shell, and place it comfortably on the new one, and then give it several little taps with his big claws, to settle it.

But Mr. Gosse has seen a stranger thing than that, about this Crab. He has had a Hermit in his aquarium, which had a fellow lodger inside his shell. I will let him tell his own story.

"When I was feeding him with cooked meat, which he having seized with one claw and held to his jaws, was munching, I saw

protrude from between the body of the Crab and the shell, the head of a beautiful worm, which rapidly glided out around the Crab's right cheek, and passing between the upper and lower foot-jaws, seized the morsel of food, and retreating, forcibly dragged it from the Crab's very mouth. Though the Crab sought to recover his hold, he manifested not the least sign of anger at the actions of the worm. I had afterwards many opportunities of seeing this scene enacted over again ; indeed, on every occasion that I fed the Crab, and watched its eating, the worm appeared after a few moments. The place of the worm's appearance was always the same. I was surprised to see with what force comparatively large pieces were torn off, and swallowed, and how firmly the jaws held the piece when it would not yield. Sometimes it was dragged quite away from the Crab's jaws and quickly carried into the shell ; occasionally, in this case, he put in one of his claws and recovered his morsel ; but sometimes the worm made good its foray, and enjoyed his plunder in secret."

This worm is a very popular worm for bait, and so commonly is it found living with the Hermit, that the fishermen in England always break the shell of a Hermit to find it.

I don't think this fellow deserves his name, do you ? Droll Hermit, I think, to have two inseparable companions, one outside and the other inside his house, and neither of them any relation to him. I guess the long-word-makers will have to hunt up a new name for him.

What sort of a family do you suppose Mamma Crab thinks it necessary to cast upon the world ? No less than from twelve to twenty thousand babies every year ! No wonder Crabs are so plenty.

There's another sort of Crab I want to tell you about. I don't know what you would call him, but I call him, the Little Doctor, and what else would you call him, when he spends his whole life making pills.

I must admit he don't look much like any doctor you ever saw—in fact, he is no bigger than a pea.

He lives on the sea-shore, and he makes his pills out of sand, though what he wants of sand-pills is more than any one knows yet. They'll know all about it before long, however, for the wise men are on the watch for him, and we shall have his whole history some day, little and shy as he is.

This droll little pill-maker is a tiny Crab, and, as I said, he lives on the sea-shore, in little holes which he digs in the sand. If you live on the sea-shore, you know all about the tide; and if you don't live there, I dare say you have heard that every day the water comes up very high on the shore, and then goes out again, so that where you can walk on dry sand at one time, in an hour or two will be deep water. Well, these odd little fellows live where the tide will cover them. As soon as it goes out, the beach is covered with thousands of them, each one busy rolling up balls, and laying them one side.

Funny enough it looks, as though the very sand was alive, so many and so lively they are. It is almost impossible to see them work, for they are very shy, and the instant they see any one coming they scamper into their holes, or if they are too far off they wriggle and twist themselves into the loose sand and out of sight in a minute. But naturalists, perhaps you know, are more interested in such little creatures than you are in your most interesting games, and no trouble is too much for them to take to find out all their curious and wonderful ways. So one of them resolved to watch Mr. Crab, and see how he lived. Seating himself on the sand, where he saw many of their pills, he kept as still as a mouse, and waited. Pretty soon the sand began to move, and hundreds of tiny heads came to hundreds of tiny doors, but seeing him there, instantly popped back again. After trying it two or three times, and finding him in the same place, I suppose they made up their minds he was some new kind of plant that had grown up there. At any rate, they finally went to work. Every one began to gather up sand and make it into pills. In a very short time the whole beach was covered with the odd little balls. It is supposed they get their food out of the sand as they roll it up; but that's only a guess.

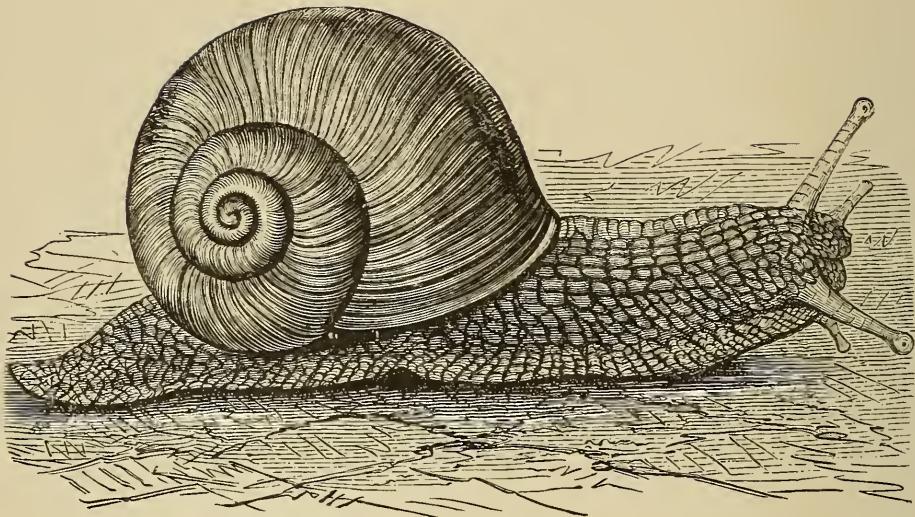
No sooner did the watcher move an arm towards the busy workmen, than there would be a sudden little twinkle on the sand, and every one would whisk out of sight. After trying a long time, he did succeed in catching one, when it rolled itself up and pretended to be dead. When he laid it down, however, it suddenly came to life, and sank itself in a minute.

There's another funny thing about them; you may dig till you are tired, where a minute ago there were thousands of them, and not one can you ever dig up. They live in villages; that is, there are large places entirely covered with their holes. Curious they look, too, all over the beach, with tiny paths leading from one to

another of them. Then ten feet off, perhaps, there won't be one of them to be seen.

As long as the tide is out they never stop work; but the first tiny wavelet that comes up, they all vanish into their holes, and every little pill is washed off. That don't seem to discourage them, however, for the minute the tide leaves the beach bare again, there they are, all busy making pills as though they had the world to supply.

You can call this curious little fellow a Doctor, but if you want to give him his common name, you must call him the Pill-making Crab, and if you are ambitious and want to be very scientific, you must call him *Sphærapœia Collingwoodi*. That is, if you can pronounce such a dreadful name.



#### *DEAF AND DUMB.*

Yes, and blind, too, some people say, though others think the two little black spots at the end of his feelers—or horns—are eyes.

Curious things those horns are, too; they can be drawn in like the finger to a glove when it sticks to your finger and turns wrong side out, and pushed out in the same comical way. The personage whose picture we have here, is the Edible Snail—which means that he is the kind people eat. I suppose you knew before now, that Snails are a favorite article of food, with many people, and the Edible Snail is cultivated and fattened for the table. The Romans even went so far as to build Snaileries, where these creatures were fed on meal and wine, and thus made very fat. Even now, it is said, there are some of these fattening houses in Europe, where Snails can be bought like beef in a market.

The Snail lives on leaves and tender fruit; indeed, gardeners are his worst enemies, because he's wise enough to select the best fruits for his dinner. He is thought by many to be blind, because

he always goes out by night and never seems to see anything in his way.

Some naturalists think the front pair of horns are organs of smell, for dull as he seems to be, he can smell his favorite plants.

His way of breathing is very curious. He is said to draw the air into his lungs, just as any animal does it, but to get it out the poor little fellow has to draw himself clear back in his shell, and fairly squeeze himself up as tightly as possible, and thus push out the air. Fortunately—if this is true—he does not have to breathe so often as we do.

The Snail in the picture, is the one commonly used in Paris on the sign boards, over restaurants and such places, where Snails are to be bought. His shell is heavy and marked with brown stripes, and his body is gray.

The shell is a spiral—as you see—and usually turns from right to left, but now and then, by some accident, a Snail has a shell turning the other way, and he is as much sought after as a four leafed clover, not for his own value, but that his house may adorn somebody's cabinet—as a curiosity.

All Summer long, the Snail eats and grows fat, but as Winter comes near, he begins to think of preparing a safe snug home for himself. He first finds a quiet place, under leaves or moss, and proceeds to build a roof over himself in this strange way, which a naturalist—Mr. Bell—had seen him do, and carefully described. That soft part of the Snail on which he creeps along, is called the foot, and it is this solitary foot which builds the house. When Mr. Snail is ready to build, he pours out—in some way which is not yet known—a quantity of very sticky fluid on the bottom of this foot; of course, the dead leaves, or dirt on which he lives, stick to the foot. He then turns it up sideways, and pours out a fresh lot of the fluid. This makes the dirt and stuff fall away from the foot, and he leaves it as the first brick in his wall. Repeating the operation, he leaves the next brick on top of the first, and thus he goes on till he has actually made a complete roof over himself.

But even this is not enough, he must have a door to his shell house inside, so drawing himself in, he pours out a thick cream-like fluid, which fills up the opening, and in a short time grows hard and solid. So there he is, safe for the Winter, his hard door and his roof, which grows hard too, protecting him from all enemies.

Snails are not only eaten in soup, and roasted over a fire, they are also mashed and mixed with milk to make it taste like cream—at least, Mr. Wood tells of one old woman who did it. He tried it so far as to prepare the cream, but he did not taste it.

There are many kinds of Snails, the largest of which is called the Agate Shell, lives in Africa, and is eight inches long. The eggs of this member of the family are an inch long.

Another Snail—the Boring Snail—is thought to make holes in a solid rock, for its Winter home.

The Pond Snail is a droll little fellow, who lives in fresh water, and has a comical way of making a boat of his shell, and sailing about without trouble. He does it thus: first he climbs up a water plant, till he reaches the edge of the water, then turns himself upside down, so that his shell is under him, and hollows out his foot so that it is something like a boat shape. He then lets go of the plant, and floats off with the current. Sometimes you will see hundreds of these odd little Snail boats sailing off together, and if you throw a stone into the water, the feet jerk in, the shells flop over, and down goes the whole party to the bottom of the pond.

The Apple Snail is another one who lives in the water. His home is in the hot parts of the world, and when the river or pond in which he lives is about to dry up, he buries himself deeply in the mud, and waits for the water to come again. Sometimes he lives thus for years.

A pretty little fellow, called the Violet Snail, from the color of his shell, lives in the sea, and has some curious ways. He is famous for making a raft, which floats him about on the sea, wherever the winds blow him. This raft is much larger than he is, and is made of a great many little bubbles of air, which, of course, makes it very light. When floating about on the ocean, the Snail rides just under water, and if the weather is rough, his frail little raft is often broken off, and he sinks to the bottom. He can draw the raft partly into his shell, but whether he can make a new one is not known.

But the drollest use of the raft is to carry about the baby Snails. The eggs hang from the lower side of it, like a row of balls. When the eggs hatch out, the baby Snails start off in life for themselves, and never, I suppose, even see their mother—if, indeed, they see anything. They eat small creatures which they find floating about. The whole raft is not more than an inch long, of

a delicate white color, and the Snail itself, about the size of a common garden Snail.

This curious little fellow has in its body a dark blue fluid which can be used as blue ink, but the object of which is unknown.



#### *A MODEL PAPA.*

Solomon sends us to the ant to learn, and I don't know why we can't take lessons from other little creatures in the world. Here's this modest little fellow who lives in the sea, and sets a most beautiful example of fatherly care and affection, yet I never heard that he was set up as a model. To be sure, he's only four inches high, but that is sixteen times as big as an ant, and virtue doesn't depend on size either.

The name of this Model Papa is *Hippocampus*, but we know him better by his common name of Sea Horse. No doubt you have seen one in some museum.

His wife—well we won't say much about his wife, for she isn't a model, by any means. In fact, she shirks all the usual duties belonging to mothers, hands the eggs over to her partner, and flirts off to have a good time in the world.

Papa Hippo doesn't seem troubled or cast down by this

unnatural mother's behavior. He prefers to attend to the welfare of the babies, and in fact he is made on purpose for the work. He has neither house nor nest, but he is provided by nature with a pocket, which does just as well as either. It is thickly lined with fat, and into it he receives the thousand or two of tiny atoms of babies, and feeds them with his own fat till they are big enough to look out for themselves. There! isn't that an example for the world?

And even that isn't all. Ordinary parents of the fish family, eat eggs and little ones, not only of other fish, but of their own, while this admirable <sup>admirable</sup> papa never was known—however hungry—to taste one of his own children. A striking virtue, I assure you—in fish life.

When he thinks the little ones—colts, would you call them? are large enough to take care of themselves, he starts them in life, by bending his tail around like a hook, pressing it against the bottom of the pocket, and just coolly shoving them out, to take their chances in a cold wet world.

This very unusual conduct is not the only strange thing about the *Hippocampus*; his looks are as odd as his manners. He has the droll fashion of wearing his bones outside, instead of modestly covered up with flesh, as most animals do; or, as some one says, he lives inside instead of outside of his bones. So he appears to be dressed in a suit of mail. And they are not ghostly looking white bones either; they are of a soft gray color, and ornamented with dainty carving.

This little oddity receives his name from the shape of his head, which is ludicrously like that of a horse, and is always carried pertly erect in the water.

The fin on his back looks like a beautiful fan, tipped with delicate yellow, and is a graceful ornament. His eyes are of a gold color, edged with blue, and they are not a pair of slavish twins—as most eyes are—looking always the same way; on the contrary, they are entirely independent of each other, and he can look two ways at once.

The favorite attitude of the Sea Horse, is holding on to a weed with his tail, and from thence darting on his food as he sees it, in the shape of worm, fish-egg, or such like delicacy. He has side fins, by means of which he can swim, always standing up (as it were) in the water. But he soon tires, and then he seizes a plant, and rests.

Perhaps his tail is the most curious thing about him. It is four sided like a square file, and is covered with scales like the rest of his body. It is long and prehensile like the tail of monkeys, and to hold on to something seems to be the desire of his life.

If two of them meet in the water, they are sure to grab each other by the tail. Even tiny atoms of baby Sea Horses, with tails no bigger than a bit of thread, will seize each other and hold on for dear life, never giving up till they are tired out.

Very little was known about the *Hippocampus*, till a naturalist — Rev. Samuel Lockwood — kept several in an aquarium, and by closely watching them found out their wonderful ways.

Fishes in general have very little trouble with their babies. They just put the eggs into some place they fancy is safe, and leave them to their fate, so that makes this little fellow's conduct all the more strange.

There are several varieties of the Sea Horse. They will readily live in a salt water aquarium, and are comical little creatures to watch.

*A COMICAL FISHERMAN.*

Did you ever hear of a man going fishing, and using his own flesh for bait?

You don't believe there are such men?—well, you will when I tell you that it is in Asia Minor, and he fishes for Leeches.

Horrid things! Well, I know they are not very pretty, but they are sometimes very useful.

The way this curious fisherman goes to work, is this: The Leeches live in the marshes, and the man wades in the water with legs bare, splashing around to attract their attention. The unpleasant looking creatures are very fond of blood, (that's why they're so useful,) and they immediately rush out and fasten on to him. As soon as he feels one, he picks it off and puts it in a little dish of water which he carries.

If it happens to be Summer when he goes out for Leeches, he has even a worse time, for they prefer deep water then, and he just has to go in swimming and let them fasten all over him, when he comes out a droll looking object indeed.

When he has collected a good many hundred of them, he sells them to a dealer who goes around now and then. But they are not yet ready for market; they have to be fattened. I don't know why, but they are thought to be better when fat. So the trader takes them to the fattening factory. (Funny business that must be!)

At this establishment the Leeches are sorted—for there are several kinds—and after a good meal of ox blood, are thrown into ponds, each kind by itself. In fifteen or twenty days, they are fished up again; not by men this time, but by a cloth nailed to a board. When slapped around in the water, they seize it, and are pulled out.

The funniest thing about them, is their sleeping car arrangement, by which these fat fellows travel thousands of miles without hurt. You see they must be kept wet, and it would be difficult to carry jars of water so far, so the men who prepare them for market, mix up a pudding of fine clay and water, and when thoroughly mixed, the Leeches are stirred into the mud. There they stay, safe and comfortable, till they reach the end of their journey.

In the south of France, Leeches are cultivated, and they have cows for food. The unfortunate cow is driven into the water, where the blood-thirsty creatures are confined, and they at once proceed to take their meal. When she has lost as much blood as the owner thinks she can endure, she is driven out, and sent off to pasture to get well and strong again. Then she comes back and goes in again, and so she goes on till she dies.

One Leech farmer who owned eight acres of marsh, had two hundred cows to feed eight hundred thousand Leeches.

They tried to use donkeys for food, as they are not so valuable as cows, but that spirited animal refused to be eaten, prancing about and kicking. He was excused.

Leeches are said to drink five times their own weight, and cause as much more blood to flow. They will take all the blood from an animal, if he does not get them off. I read of a lizard nearly a foot long, which was thrown into a Leech pond. In a few minutes it was covered with the horrid creatures, and before long, it was nothing but a skeleton. Sometimes a frog will leap out of a pond covered with these tormenting creatures, and roll in the dirt till he gets them off. If he don't get them all off, he's a dead frog. Sometimes an unfortunate creature will swallow a Leech, and then he has a nice tenant in his stomach.

In France, where these interesting creatures are cultivated quite extensively, the gatherer wears a linen bag around his waist. He is a forlorn and dreadful looking object, hollow eyes, white lips, and altogether, looking like one just up from a bed of sickness.

If a Leech is allowed to eat all he wants, he can take enough to last him a year, and that is the reason why they are always in demand. It is so hard to coax them to take any more, that it is less trouble to take fresh ones every time.

I have not mentioned what they are used for—I hope you don't know by sad experience—but doctors use them to draw blood from people.

Leeches change their skin every few days. The eggs of these creatures are wrapped up in a little cocoon not quite an inch long, each one containing from six to sixteen eggs. They are put into clay banks. The color of the Leech used by the doctors is green, spotted with black. He hides himself in the mud, if the weather is bad, and when the frost comes, he buries himself very deeply in the same material.

When he is gathered, he is often very dirty, and has to be washed and cleaned up for market. The fisherman who gathers them, can sometimes catch twelve dozen in a few hours—four or five—but you may be sure he don't do anything more than day.

I told you how the Leeches travel from Asia Minor, but for shorter journeys, in France, they are put in bags, seven or eight pounds in a bag, packed into a wagon with plenty of straw, and sent off. Arrived in Paris, they are emptied into large reservoirs, and kept ready for use.

How many do you suppose there are in a pound? About seven hundred.

Perhaps you'd be glad to hear that America is considered the best market for Leeches, because we don't grow our own, and I'm sure I'm glad of it, for they are not very nice things to live in ponds where any other live thing wants to go.

There is a land Leech, native of Ceylon, which is fully as disagreeable as the water species, and more of a nuisance, for he don't wait for victims to come to him; he goes after them.

They are very thick, and often every twig and grass blade will have one on it waiting, stretching out his long body to get hold of something. They seize on a passer by, crawl up his clothes, get at his neck, go up his coat sleeve, and into his boots. Slim and long as they are when they take hold, they soon swell out full and large, and, some writers say, "hang from horses and cattle in great clusters."

## SEA CUCUMBERS.

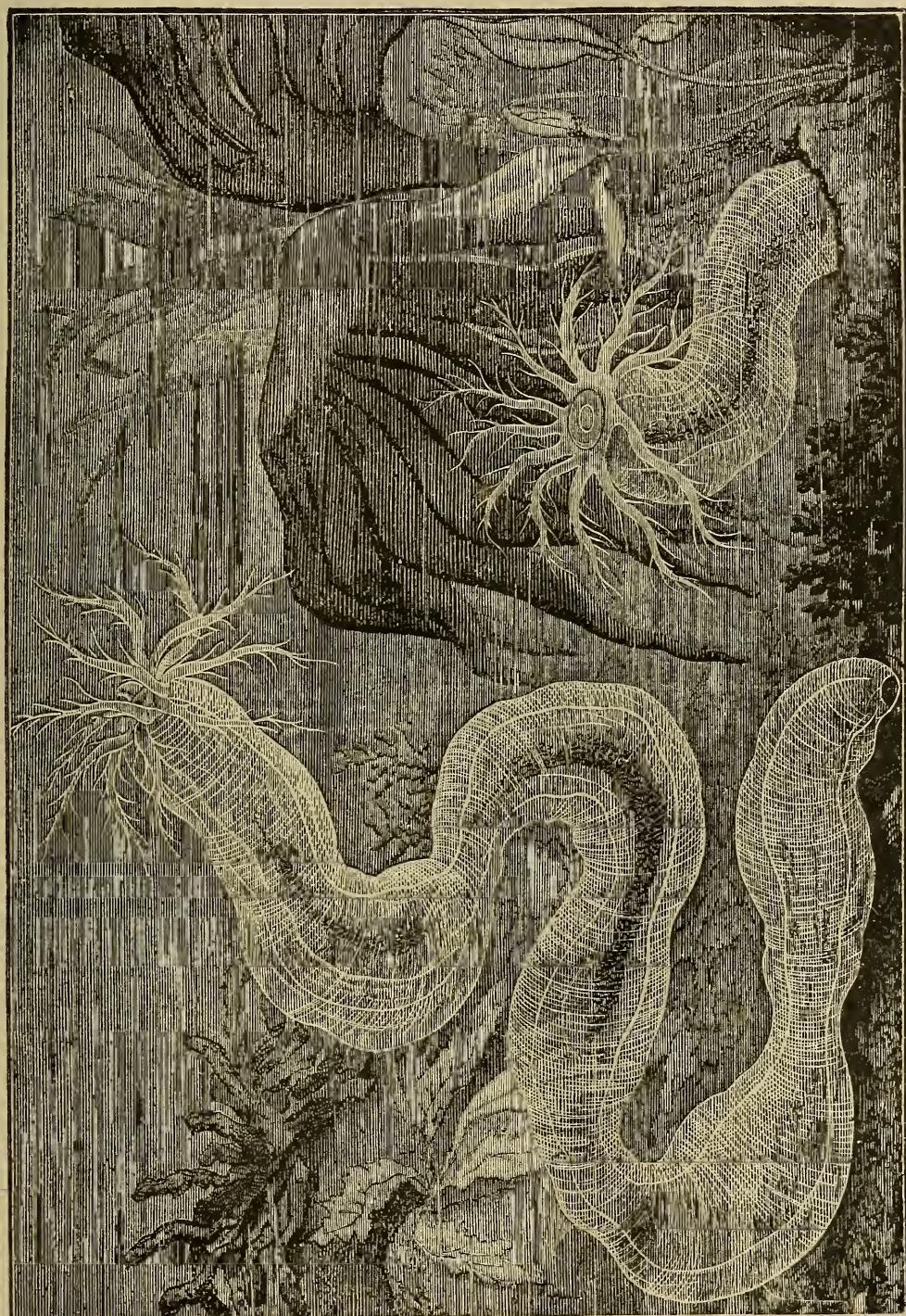
What would you think of an animal, that when caught, would kill itself rather than be a captive, and do it in the oddest way, too ; by throwing out its teeth, its stomach, and all its internal organs, becoming a mere bag in your hands ? That is just what the Sea Cucumber does. But after all, this suicide seems to be only a sham, for these organs will all grow in again.

The Sea Cucumber—as you may suppose—gets its name from its resemblance to the garden cucumber, and is one of the most curious creatures in the ocean. It has down its sides, little wart-like projections, like those on a cucumber, and when it wants to walk, it pushes from each of these a tiny foot with a sucker on the bottom, and it can go anywhere—even up the sides of a glass dish.

There are other queer things about him. He is said to eat coral branches and even granite ; at least, his stomach is often found full of these things, though marine mollusks and other creatures are his regular food. It is found of all sizes, from one inch long to more than a yard. Its mouth is at one end, and surrounded by what you would think were the petals of an elegant flower. But the wise men call them *tentacula*, and they take the place of arms, and are organs of feeling to him.

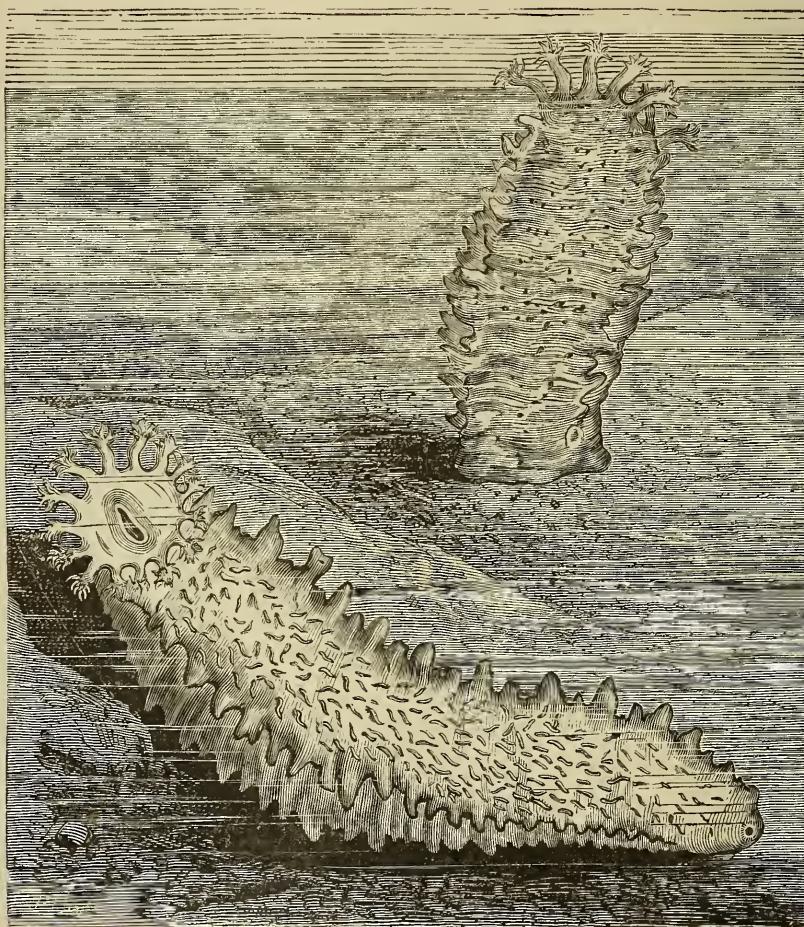
The South Sea Islanders will not touch one of them, while the Chinese devour them as a luxury. But the Chinese eat rats and puppies, you know, so we can't expect them to be very dainty.

Thousands of Chinese boats are sent out every year to fish for Sea Cucumbers. Huts and furnaces spring up on the shore as if by magic. They catch them either by spearing, or diving and seizing them in the hands. As soon as they are brought ashore they are boiled, then flattened with stones, and spread out on bamboo nets to dry. When dry they are smoked, and are then supposed to be fit to eat, though one traveler, who did not like them, says they look like sausages rolled in the mud and then thrown up the chimney.



The common Sea Cucumber has more elegant relations. One that is found on the Atlantic coast, is a beautiful crimson color, with a wreath of tentacles exquisite as the most beautiful sea weeds.

Naturalists call these curious fellows *Holothuria*, and here is a picture of one of the humble relatives of the beautiful creature in the other picture.



Another one, living in the Chinese seas, is eighteen inches long, and of a lovely rose color, and transparent as glass. Running the whole length of its body are fine delicate white stripes, looking

like ribbons, and at the head, the most beautiful wreath of white tentacles. This beautiful creature is so transparent that you can see its intestines through the skin, and in one, that I read of, they were filled with coarse grains of granite. You can see it in the picture on page 249.

This Sea Cucumber has another odd habit. If he is kept in an aquarium, and not fed, he will throw off part of his body. First a deep ring comes in the body, and before long, the part below the ring drops off. So he will go on, dropping off piece after piece, till nothing is left but his head—like a little round ball—and his beautiful crown.

*OYSTER FARMS.*

How do you like the idea of Oyster Farms, where if you wanted a dish of Oysters, you would only have to go out and pick them as you do apples? You country children, I mean, for as far as city children know by experience, apples grow in barrels.

Shall I tell you how these droll farms came to be started? This was the way. Men ate so many Oysters that they began to be quite scarce in some places, and people feared that we would drain the sea, so some enterprising men set themselves to work to cultivate them, as we do potatoes—only in a different way.

When the little Oyster is launched into life to take care of himself, his first aim is to secure a home. His ideas are very simple, being merely a holding on place. Holding on is the specialty of an Oyster. If he cannot at once secure a safe home, he is almost sure to be devoured by fishes, for those slippery creatures are as fond of Oysters as you are.

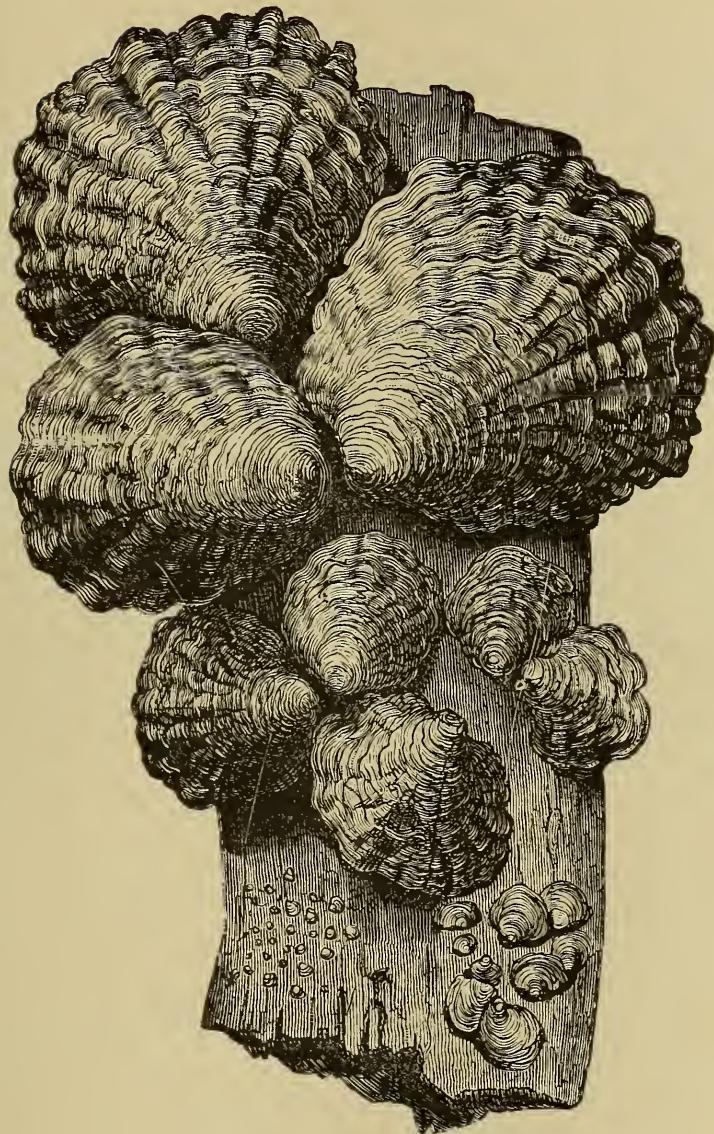
As soon as the wise men found this out about the baby Oyster, they thought of the idea of providing homes for the little creatures, and they made some nurseries in this way. They drove strong stakes into the mud—under water, of course—and between the stakes wove branches of trees. That was all.

Having the nursery ready, the men next brought several boat loads of old Oysters and placed them on the ground around the stakes, to start the farm. As the young Oysters were hatched, they naturally attached themselves to the branches, and proceeded at once to grow. Each Mother Oyster is said to lay two millions of eggs in a season.

There are other ways of arranging Oyster farms. One in use in Italy, where a small lake is—or was—devoted to the purpose, is to build a small hill of stones and make a sort of fence around it with stakes.

The old Oysters live on the hill, and the young ones on the stakes. All the farmer has to do when he wants Oysters is to pull up a stake, and pick them off. Here is a picture of a whole family,—from the tiny bits of babies down in the corner, to nearly grown up children.

In France there is a different way. The farms are enclosed



in stone walls, and large stones are scattered through the farm, among the Oysters that live on the ground. Of course the babies live on the stones. There are thousands of these farms on the shores of France, and they even go so far as to improve the flavor of the common Oyster, by artificial feeding.

Don't you think it must have been a brave man who first ventured to swallow such a curious object as an Oyster?

There is a legend about it which may be true—it's old enough to be so—and I will tell it to you. Once upon a time, a man walking on the sea shore saw an ugly looking object which he carelessly kicked away. The Oyster—for it was one of that family—probably astonished at such rough treatment, imprudently opened its shell, perhaps to see who its enemy was.

Seeing the cream colors of the inside, the discoverer thought he would examine it, and he took it up to do so. The Oyster—insulted—slammed the door in his face, catching the man's finger in his haste. As soon as he could get it out, he naturally put his smarting finger to his mouth, when lo! he was delighted with the taste. He at once proceeded to break open the shell, and taste cautiously. The result satisfied him; he ate the whole. It is fair to presume that he told somebody.

All great men have liked Oysters; and all small men, too, I fancy, only there is not so much said about them. It is said that Paris alone, uses one million Oysters a day.

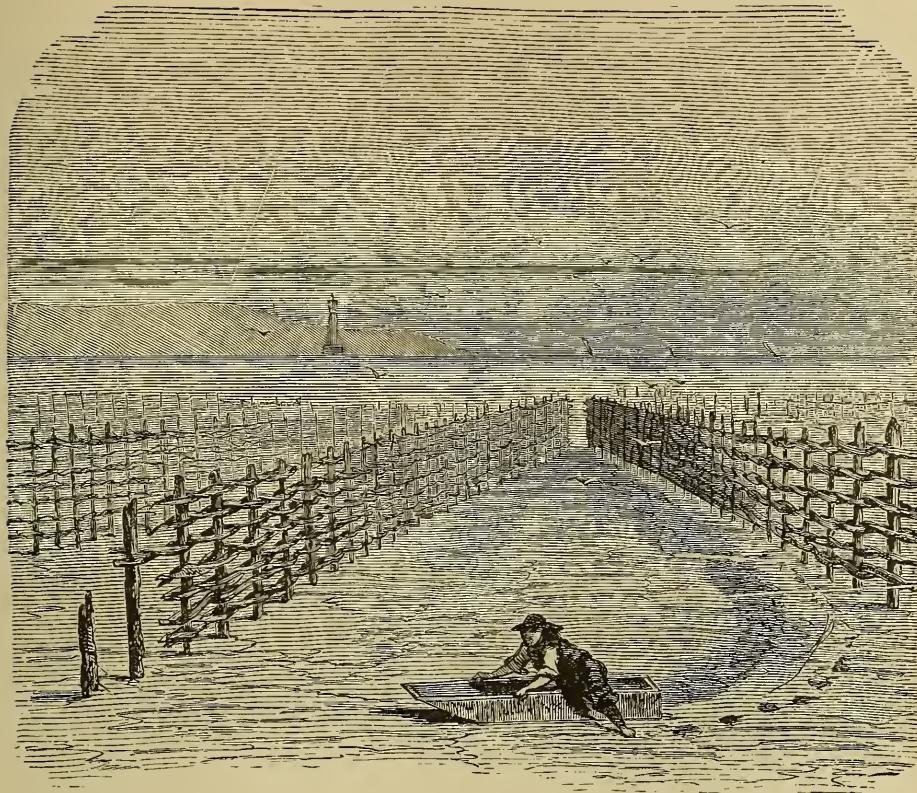
Not only Oysters are cultivated, but Mussels, which you know are something like Oysters. I want to tell you a story about this picture on next page, and how one man started a great industry in France more than six hundred years ago.

He was an Irishman by the name of Walton, and he was wrecked in the Bay of Aiguillon, and lost everything he had, of course.

Trying to support himself, he turned his attention to hunting sea fowl which abounded there, and he made a net in which they became entangled. This net was fastened to posts which he drove down in the mud.

But the bay was one sea of mud, and it was nearly impossible for him to get about with a boat, so he went to work to get up what you might call a mud boat. It was like the one in the picture. It was about three yards long, and one yard wide. The sailor of this droll boat had to kneel on one knee, as you see in the picture, with one hand on each edge of the boat, and his left leg hanging outside. To get on, he gave a great shove with his left foot, and slid forward a few feet. In this way he could get around the bay to see to his nets.

But he now began to notice the Mussels, which were very abundant there. He saw that they attached themselves to the posts which held his nets, and that they preferred to get a little



above the mud, and that those which did so were nicer than the others that grew in the mud. From this he took an idea, and at once proceeded to try it. He planted in the mud a long row of posts, about a yard apart, and six feet above water, and laced together by branches. The rows were made to form the letter W, his initial letter. The branches caught the little Mussels, when first thrown out into the water, for they are something like an oyster, and want a holding on place.

He soon had a splendid crop of Mussels, as he deserved, and his neighbors began to make Mussel farms for themselves, and now the little bay is full of them.

When the little Mussels are about as large as a bean, they are transplanted to the most favorable place for growth, and when they are old enough to live in the air for hours at a time, they are transplanted again. Sometimes they are moved three times before they are taken to market.

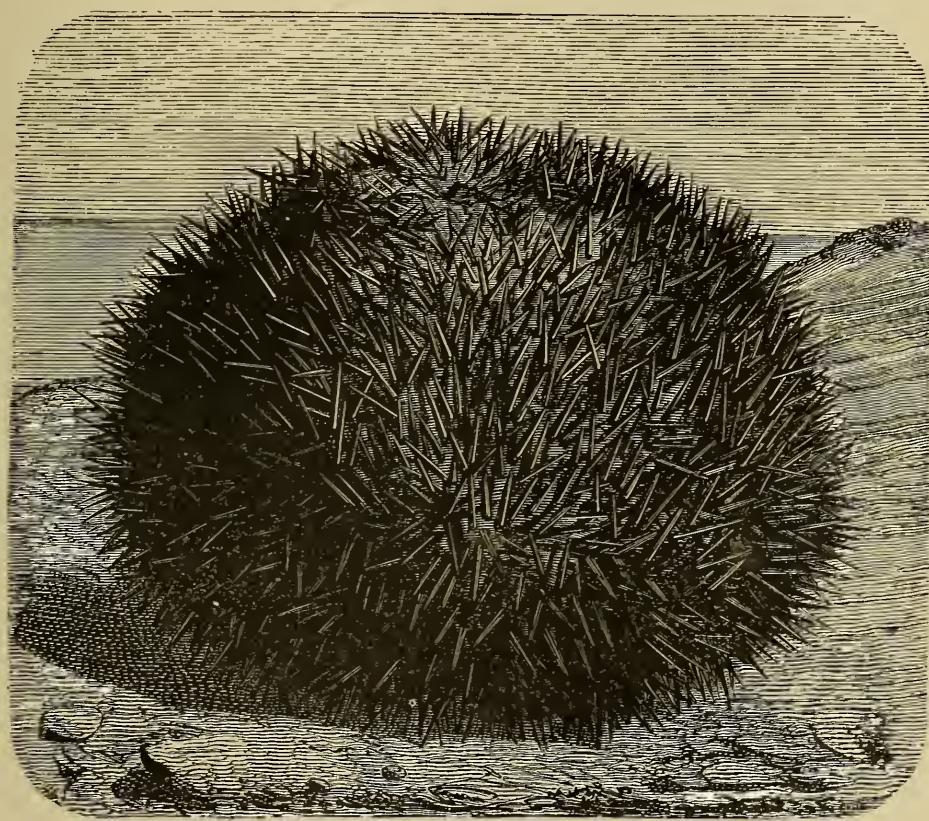
This Mussel farming neighborhood sends out every year nearly two and a half millions of dollars worth of its live product.

From July to January is the season for Mussel eating, and then the people are busy enough. The farmers—if you can call them so—gather a boat load of Mussels and bring them home, when their wives take them and wash, and pack them in baskets and panniers, to go on the backs of pack horses or by carts to their market.

*THE BABY THAT LIVES IN A BOX.*

There are a good many funny things going on in the sea.

Wouldn't you like to go down there, and spend a day watching the wonderful creatures that live there? If you didn't have to breathe, you might do it with ease.



One queer little fellow, whose home is in the bottom of the sea, lives in a cunning little box, about as big as an eggshell. He is called a Sea Urchin, and there are several curious things about

him. In the first place, he always lives in one house—the First of May is nothing to him. When he is a baby, about as big as a pea, the house is just big enough for him, and when he grows as big as an egg, the same house has to do for him.

Of course, it has to be made bigger, and it isn't done as we make our houses larger, by adding wings, building a story higher, or an addition behind. He just goes to work and enlarges his house all over. Although it looks like a box, and seems to be made of one piece, like an eggshell, it is in fact, made of six hundred pieces, fitting so nicely together that one can scarcely see where they join. This curious little Sea Urchin finds lime in the sea water, and he takes it and enlarges his house at every joint, evenly and regularly, so that it is always exactly the right size for him.

When he walks about, he has to take his house with him. Aren't you glad you don't have to carry your house about everywhere you go? If you did, you'd want it just to fit you, as the Urchin's house fits him.

His back is covered with green and purple things like bristles, called *spines*, and he looks as much like a chestnut burr as anything. He is not a beauty, and by the side of some of the marvelous and exquisite creatures of the sea, he may seem dull and uninteresting, yet he is really one of the most wonderful creatures in the world. Every part of him is full of beautiful provision for his peculiar life.

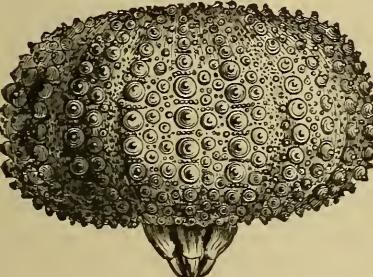
I have told you about his shell, but there are his spines quite as interesting. They are of a pea-green color, tipped with purple, and every one set upon his shell by a ball and socket joint, the most perfect joint known. And more than that, each one is under the direct control of the Urchin, so that he can raise them and lay them down at will. To do this, requires for every spine several muscles, and as the common Sea Urchin has at least twelve hundred spines, you can fancy the great number of muscles needed in that small body.

But besides his twelve hundred prickly spines, Mr. Urchin has on the same body a great number of feet, little hollow sort of tubes, with suckers at the end. Of these useful little organs, he has the very respectable number of about a thousand, so you see he has no trouble to get on in the world. His feet come through holes, which are placed in rows all over his body, and he walks by turning over and over, like a ball. Sometimes his head—if he can be said to have a head—is up, and sometimes down. The

suckers on his feet are like the wet leather suckers with which you boys lift stones, and they work so well that their owner can walk up the glass sides of an aquarium.

But spines for protection, and feet for walking, are not all that the little Urchin carries outside of his shell; there are a good many of what are called—for short—*Pedicillariæ*, and the use of which is not yet decided by the wise men. They look something like spines, only they have a sort of three bladed end, which continually opens and shuts. Whether to keep off the sea weeds and little zoophytes, which are sure to settle and grow on any object which remains quiet on the bottom of the sea, or for whatever unknown purpose, there they are, and their number added to the spines and the feet, make the enormous number of four thousand appendages, which the little Sea Urchin carries on his shell. And he's just the size of the picture, too!

But here is another picture of his shell, with the spines and other things all off. The little knobs you see, are the places on which are fastened the spines and the other things with the long name; and the holes are the places through which he puts his feet.



I told you how he enlarged his house, now look at his teeth! There are five of them, which you see sticking down below his shell, meeting in a point. They are very hard at their points, like the teeth of rats, which are made to gnaw very hard substances, and soft at their bases, so that, as they wear off at the end, they grow longer from the top. Thus, you see, he will never starve because his teeth are worn smooth.

One thing, which the Sea Urchin is fond of doing, will show you how hard are his teeth. He hollows out a house for himself in the hardest rocks, entirely by digging it out with his teeth. Droll enough it looks, I can tell you, to see a family of Sea Urchins sitting in holes in a rock, sometimes as many as a dozen together. His teeth are also, of course, used to eat with, and because shells have been found in his stomach, he is supposed to dine on some of his neighbors at the bottom of the sea.

It is generally supposed that he has no eyes, but a gentleman, who tried to take one out of a shallow pool, was convinced that it

could see him, because, whichever way he approached it with his hand, the creature's spines were instantly turned that way, as if for protection.

The ways of the Sea Urchin are interesting, though it is only since he has been induced to live in an aquarium that men have been able to study them much. I have spoken of his droll way of walking, rolling over and over, and of his making for himself a safe hole in the rock, but some of them have another way of hiding. They dig holes in the sand with their spines, throwing the sand up violently as they work, and gradually sinking down, then using the spines on the back to draw the sand back over them, so as to hide them. But they have no idea of being buried alive, so they arrange a little hole with the same useful spines, through which they breathe and receive the sea water.

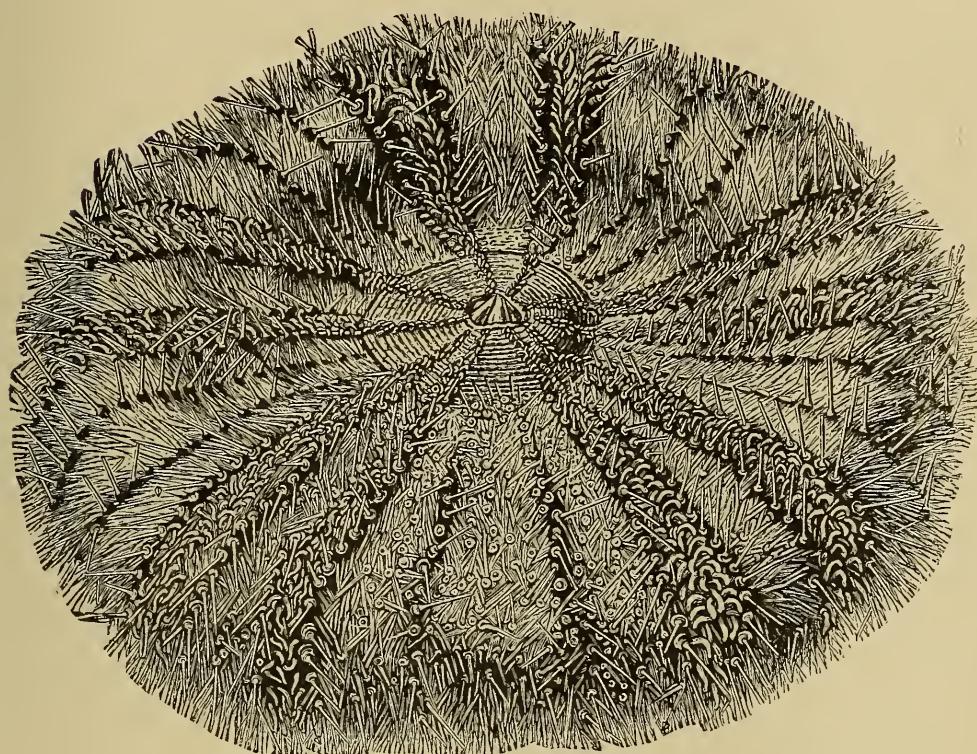
A naturalist, who has studied them in his aquarium, tells of some odd habits of theirs. They are very fond of lifting up little stones, which lie on the bottom of the tank. One will attach some of his feet to a pebble, and holding it up over his back, will walk up on a rock, and stay there a long time, with his stone held up over him, like an umbrella. Sometimes he will carry three or four stones up, and again he will collect so many of them that he will be nearly covered with pebbles. What is the object of this performance, no one can guess.

Sea Urchins are sometimes called Sea Eggs, because they are good to eat. They are caught in wooden pinchers, from shallow water, or in a gloved hand. They are eaten raw, like oysters, or boiled, like eggs. They were a favorite dish among the Greeks and Romans, served with wine and parsley.

There are other Urchins besides the common ones of which I have told you. On the opposite page is a picture of one which is very large and of a bright scarlet color. This picture is not as large as the creature himself, for he measures six inches across. He is not hard and stiff, like most of his family, but can flatten himself down, like a cake. He can do this because the hundreds of pieces, of which his shell is made, are not joined solidly, as in most Sea Urchins, but lap over each other, and are united by a sort of membrane, which is elastic, of course, and allows the shell to change its shape.

There is one kind of Urchin called the Piper Urchin, and a whole family called Heart Urchins. These last, have very slender

spines and delicate shells, live on vegetable food, and hide in the sand. They are somewhat in the shape of a heart.



In some of the hot parts of the world, Urchins are found of a jet black color. They live among the rocks, and are very pugnacious, inflicting painful wounds with their sharp spines. It seems almost as if they could dart the spines out, for one naturalist tells that when he approached one, he found his hand full of them, and they were barbed at the end, so that when he pulled them out the head remained in the wound. When he came near the creatures, they would give an irritable shake to their spines, as though to warn him away.

One of the Urchins is called the Cake Urchin, because he is so flat, and another the Wheel Urchin, because on one side he has what looks like the square teeth of a cog-wheel, and on the other side the teeth are marked out, but apparently, not yet cut.

The spines of Urchins sometimes protect others, as well as themselves. A naturalist found a small creature, who had taken possession of an Urchin's spine, while it was on the owner's back, hollowed it out, enlarged it, and made it a comfortable home for himself. Of course, he was safe from all enemies under the shelter of those sharp spines.

Nothing is more wonderful, in the history of this family, than the way the baby Urchin grows, and develops from the egg. He assumes several shapes before he really comes out an Urchin, like his Mamma. Whatever way you study them, the Urchins are among the most marvelous creatures of the sea.

*A FUNNY FAMILY.*

You've heard a good deal about the families who live in the sea. There are the *Polypifera*, the *Mollusca*, and—O dear! I can't tell you half the interesting families, with dreadful names, who live in that damp place.

I wonder what they'd think, if they knew what names they are known by, up here!

I want to tell you about one family. They have their honorable, scientific name as well as their neighbors, and it is *Medusa*, but people not very wise—like you and me—call them Jelly Fishes.

It's a very good name for them, too, for they have no bones, and they look more like lumps of jelly than anything else. When they die, they just melt, or dissolve away into nothing. A Jelly Fish weighing thirty pounds, will, in a short time, fairly melt away, and leave hardly anything but a wet spot on the sand.

In spite of this unpleasant habit, they are the most beautiful family in the ocean. To begin with, they are almost transparent, like soap bubbles, and of the most exquisite colors. They are so brilliant, that in pleasant weather, when they ride near the surface, they color the sea for miles and miles. And at night, they not only color it, but give it a most wonderful phosphorescence.

The waves fairly sparkle, and at any disturbance, the water seems to burst into red or blue flames. A boat going through, seems to sail in a lake of melted silver, and the spray looks all afire. It is a marvelous and beautiful sight, and all due to these little Jelly Fishes.

These soft, transparent little fellows, are not very easily examined. There really seems to be nothing of them but a lump of jelly, and naturalists couldn't make much out of them, till one of them happened to think of an experiment to try.

He could easily find a mouth,—indeed, I suppose there's hardly a creature in the sea, or out of it, that hasn't that useful organ. Well, into this mouth he forced some milk. The funniest dose that Jelly Fish ever took.

Of course the milk went to his stomach, and as the naturalist could see through him, he could see just where it went. And thus

he found out, that his structure was most beautiful, and though he had no bones, he had as many organs as if he was full of bones.

A very odd thing about him, too, is that he breathes through his skin. You would naturally think such a delicate, dainty creature, must feed on dew. Far from it; he is very greedy—snaps up everything that comes in his way, and stuffs it into his mouth.

There are many varieties of this droll family—all sizes, from a tiny atom of a jelly-drop, the size of a marble, up to those nearly as large as an umbrella. Many of them are shaped like an umbrella, with most beautiful fringe hanging from the edges. But this fringe, however lovely it may look, isn't safe to touch, for it is well armed, and stings dreadfully. In fact, the pretty creatures have another name, not so nice as Jelly Fishes, and that is Sea Nettle.

One of them, distinguished by the pleasant name of *Rhizostoma*, is as large as a big parasol. It is white, with violet and blue border. It has no fringe, but has eight innocent looking arms hanging down under this blue and violet umbrella. This oddity has a great many tiny mouths, all down the edges of its arms, and of course it must eat the smallest creatures, that one can't see without a microscope. When he is disturbed, he can shut his umbrella and sink. There's a picture of him on next page.

Another of the family has a mouth big enough to make up for his cousin's little ones. He is ornamented with beautiful bands and stripes on the body, and long scarlet ribbon-like streamers from its deep scollops.

At some seasons, the Mother Medusa is also adorned with gay festoons of tiny eggs of the loveliest colors.

There's a funny thing I want to tell you about these eggs, when they are hatched into babies. Most babies—you know—are like their mothers; that is, a cat's baby is a little cat, and a cow's baby a little cow. But a Medusa's baby isn't a little Medusa. Not by any means. First, it looks not much like anything, but it gradually grows till it looks like a pile of live plates. After living a while in that shape, the upper plate begins to wriggle and twist, and finally with a mighty jerk it comes off, and there's a little star-shaped creature, that after a while grows like its mother. The next plate soon gets uneasy, and thus they all finally separate.

Another of the family has still odder babies. Out of one egg will grow a creature that looks like a plant. It is fixed to the rock,

and can't get around, but lives and dies, a beautiful feathery or plant-like animal. But strangest of all, its babies are like their grandmother.

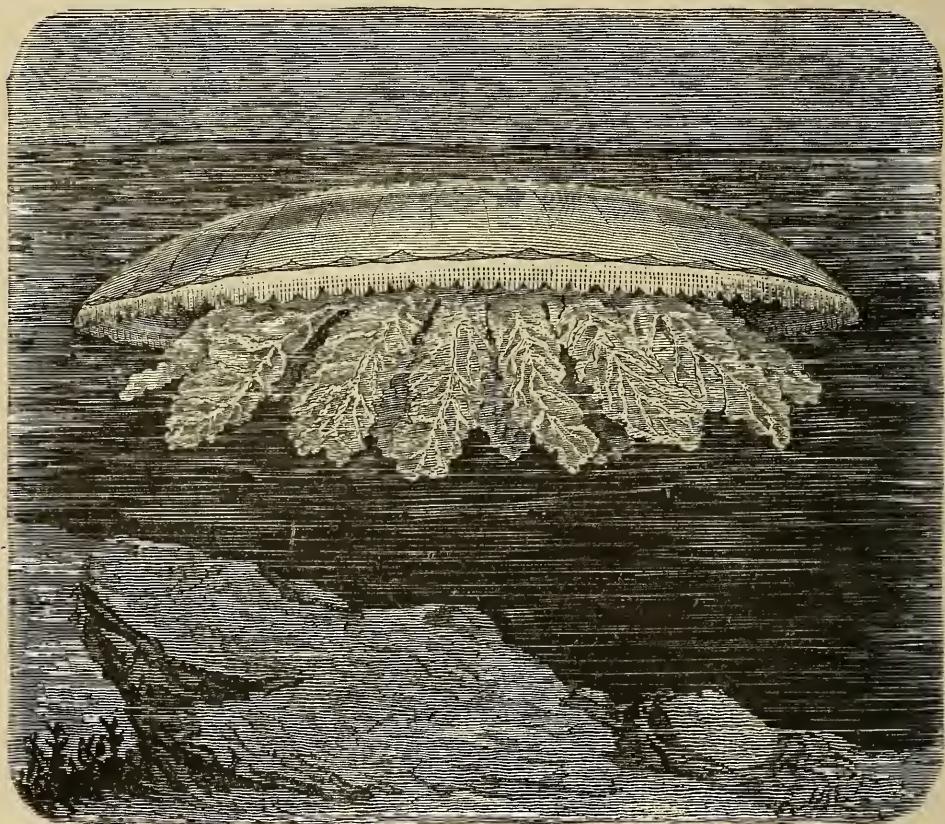


One of the family is quite famous as the Portuguese man-of-war. It looks like a floating bladder a foot long, of transparent crystal and blue. On top, stands a sail or comb, with red edges, and under the water, hang long streamers, blue and violet-colored. They can be stretched out eighteen or twenty feet, but pretty as they look, they're very dangerous to little fishes. As soon as he touches one of these garlands of death, he is seized and paralyzed. Then the streamers roll up and carry him to the mouths, of which this beauty

has a good many. They suck the good out of him as you suck an orange. In this way he can eat fishes much bigger than himself.

He isn't a very nice fellow for a man even to touch. One naturalist accidentally had his hands entangled in these pretty floating cords, and in an instant he felt as though his hand had been plunged into boiling oil.

You'd soon learn to keep your hand off of things if you had much to do with Sea Nettles. And that's a very hard lesson for some people to learn.



Here's a picture of another of the Medusa family.

Mr. Gosse, an English naturalist, kept a Medusa alive for some weeks, and had an opportunity to study its ways. He learned how it took its food, and at last he saw a most curious thing. The creature deliberately turned itself inside out, and instead of looking

like an umbrella, it looked like a cup. Its long hanging tentacles hung from the edge of the cup, and it no longer swam about in the water, but sat on the leaves of a water plant.

It did not live long after this.

These strange creatures have always been much admired and noticed, and have had several names. Because they expand and contract as they swim, people who lived long ago called them Sea Lungs.

Because of their disagreeable habit of stinging, they were called Sea Nettles.

Then—as I told you—because of their jelly-like bodies, they have been called Jelly-Fishes.

And besides all these—as if these names was not enough—each one has his own proper book name, as learned and unpronounceable to little mouths as any of them.

*MORE WONDERS.*

What would you think, to see sailing along in the sea, two pear-shaped crystal bodies, with a long string of pearls hanging



from it, and from every pearl a silver thread—as you see in the picture!

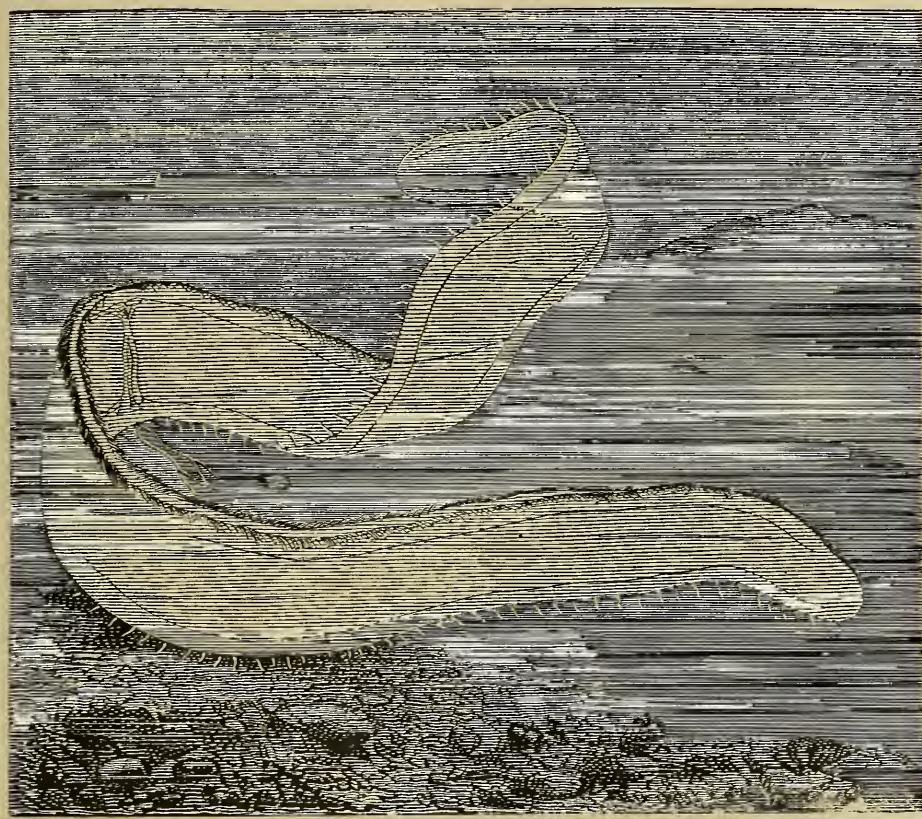
If I should tell you it was a fish, would you believe it?

Or if you saw a string of soap bubbles, four or five inches long, and floating after it in the water a long scarlet cord, with elegant silver fringe, and scattered all over with exquisite beads.

And if I should tell you the dainty thing was alive !

And if you should see a cluster of crystal beads, more lovely than any you ever saw, with a long rose-colored ribbon hanging from it, and a splendid silvery fringe from each side of the ribbon.

If I should tell you it was an animal, and could eat !



Or if you saw floating around in the water a transparent soap bubble, the size of a marble, ribbed off like a melon, with thousands of little paddles all down the ribs, with which it beat the water and darted about like flashes of light, and hanging from the airy little bubble two long silver cords with fringe of short threads that could curl and uncurl, and had each one a tiny sucker at the end.

Wouldn't you think that fairy stories were outdone ?

Well, so they are! No one ever imagined such wonders as are found in the sea every day.

These beauties, and a great many more that I haven't room to describe, belong to the strange families in the sea. And all the beautiful hanging fringes are so many fishing lines hung out to catch little fish and carry them to a hungry mouth.

I think the oddest of these creatures is called *Venus' Girdle*.

It looks like a ribbon—long and narrow, of blue and silver color, and fringed on both edges.

See his picture on preceding page.

It is found in the Mediterranean Sea, and is often five feet long and only two inches wide. It curls and un-

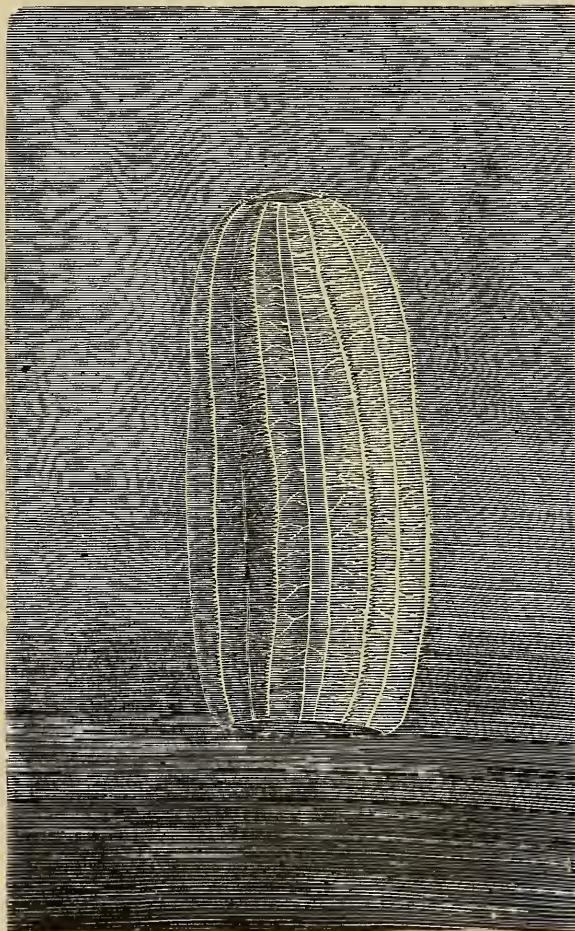
winds itself in the water, and is a beautiful thing to see. In some places, it is called the Sea Sabre.

The last picture of these beautiful creatures is called the *Beræ*, though sailors sometimes call them Sea Cucumbers, a shameful name for such a beauty.

Here it is.

The body is of a pale rose color, covered with small red spots. It has fine fringes down its sides which vibrate in the water, and produce the effect of all the colors in the rainbow. It looks like glass, and changes its form, sometimes swelling up like a ball and then reversing itself to look like a bell, and at other times long, and as it is in the picture.

It has a large end at its lower extremity, and a monstrous



stomach, occupying the whole of its inside, but—sad to say—no heart!

Another odd little creature that lives at the bottom of the sea is called a "Currant Squirter."

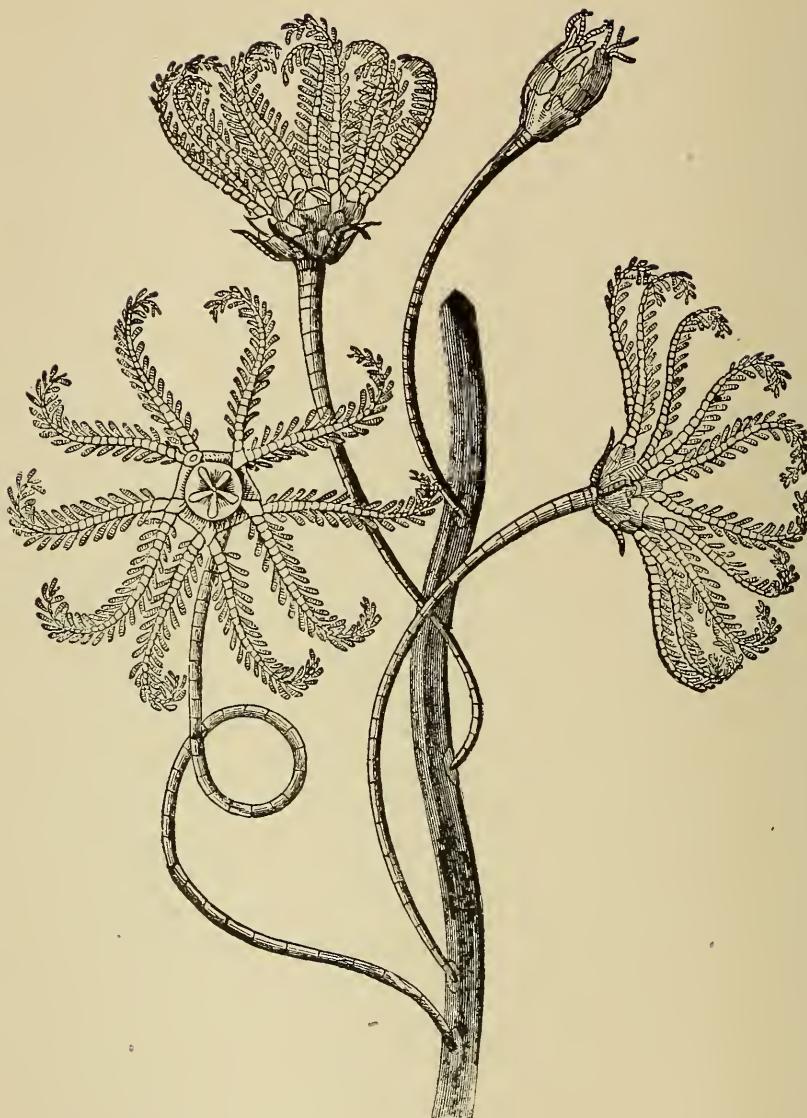
Perhaps you think that is a funny name, but it isn't a bit funnier than the fellow itself. In the first place, the whole family live on an old shell, or some such thing, and never think of leaving it. A nice quiet family they are, and very pretty for an aquarium, for they look exactly like drops of clear scarlet jelly.

They get their name from a very curious fancy they have for "squirting." In fact, it seems to be the only amusement the poor things have.

The largest one on the shell, is generally about as large as a cherry cut in half, flat side down, and she is the mother of the group. The baby of the family is the size of a pin's head, round, and red, and pretty as its Mamma. The rest of the family are all sizes between the two. But I must tell you about the "squirting."

To begin with, she draws the sea-water into her mouth—which is in a funny place, on top of her head. The sea-water is full of tiny atoms of creatures, suitable to eat, and when the Squirter has taken all the food from the water, she squirts it out again, making a very droll little fountain of herself.

She likes squirting so well that she even throws off her babies in the same way. Comical little dots of jelly drops they are, too. They go up quite high, and where they fall they settle for life. This is their first and last journey. After that they proceed to grow and squirt for the rest of their days.

*THE SEA LILY.*

What do you suppose a Sea Lily is,—a Lily that grows in the sea? Well, it is; and here is a picture of it. Isn't it pretty, with its graceful feathery petals, and its long flexible stem?

But it is the oddest flower you ever saw, for it has a mouth and a stomach, and it is, in fact, an animal. Didn't I tell you we'd find wonders in the sea? The animal consists of two parts, the stem and the head. The stem is merely a series of stony joints, with a small hole through each, in which is some gelatinous matter. The head—or the blossom, as it looks to be—is the true animal. It consists of a sort of stony cup to hold the organs of life, and the arms. The petals—or arms—are at first five, as you see, then they divide into ten, and sometimes they branch out so as to make more than a hundred lovely feathery arms, waving about in the water.

Their business, however, is not just to look pretty, but to catch something to eat. For the Sea Lily has a mouth—as I said—and a good big one it is, hidden away among those lovely feathery petals. When a little fish touches one of them, it is at once seized and stuffed into the mouth, and then the arms open again and look as innocent as though nothing had happened.

There's another droll thing about this family. Having no fingers or forks to pick out the bones, they are obliged to swallow their food, bones and all. But they don't like bones in their stomach any better than you do, so when the meal is all digested, they just open their mouths and throw out what is left.

Such an arrangement might be convenient for some children I've seen, who don't seem to have time to eat like other people, but swallow their food whole, like the little Stone Lily.

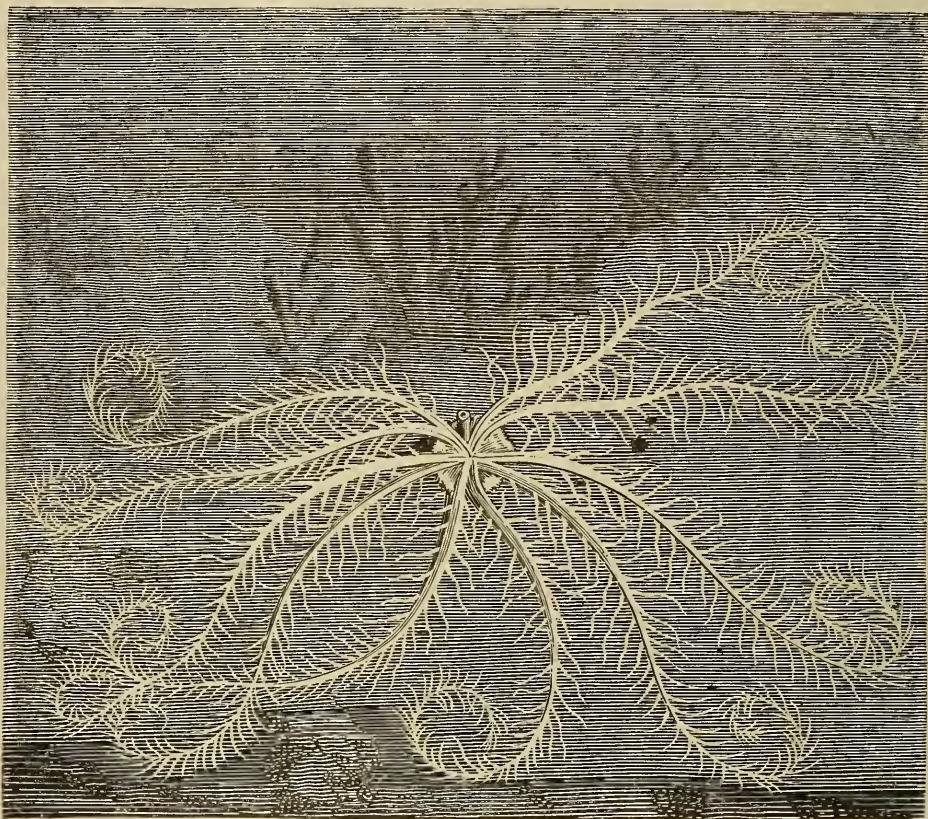
If the water around him is too much disturbed, he folds his arms and looks exactly like a lily-bud that has never been opened, as you see in the picture. If he is sufficiently alarmed, he can throw off his arms, and they will grow on again.

Some of them live loosely fixed in the soft mud, and can no doubt get about a little.

One of these creatures—the Rosy Feather Star—has a curious history. When he is a baby, he is seated on a long stem, which moves about in the water like a real flower in the breeze. But when he is full grown, he gets tired of his rocking cradle, and wants to see more of the world, so he breaks away from his home, and starts out for himself, swimming around in the water, or holds on to the rocks or weeds, with his feathery arms. He can hold on very tightly too, as a gentleman who kept one in an aquarium tells us.

This gentleman says it is very hard to pull him away from his hold. His arms hook down and fasten to anything with as much power as though each feathery bit was a claw.

Here is a picture of the beautiful creature. He is of a bright rose color, and about as large as the picture.



The same gentleman tells us that when resting, the Feather Star bends his petals in the form of a letter S.

The family to which this creature belongs, was once very common in the ocean. Whole mountains of marble are found to be made entirely of these pretty Stone Lilies, dead and turned to stone, ages ago. I told you their stems were merely joints, with a small hole through each. The arms are made of the same kind of joints, and sometimes as many as a hundred and fifty thousand

joints have been counted in a single head. These joints—turned to stone—are often found cast up on the sea shore, and in old times, when people were very superstitious they used to be collected and strung, to be used as Rosaries. They were called St. Cuthbert's beads, and were said to be made by an imaginary Saint of that name, for that particular purpose.

There are not so many varieties of the family to be found now, as used to live in past ages, but there are still several kinds occasionally brought up by the dredge—for they generally live in the deep sea—and can be caught in no other way. One that is sometimes found, is a pretty little thing, not quite an inch long, with a stem the size of a piece of thread. Still another is a few feet high and has a stem the size of a drawing pencil.

Those that lived ages ago, were often ten or twelve feet high, and the stem an inch through.

The whole family of these beauties is said to do the duty of scavengers in the ocean, destroying vast quantities of substances that would, but for them and others in the same business, infect the sea, and kill all the fish.

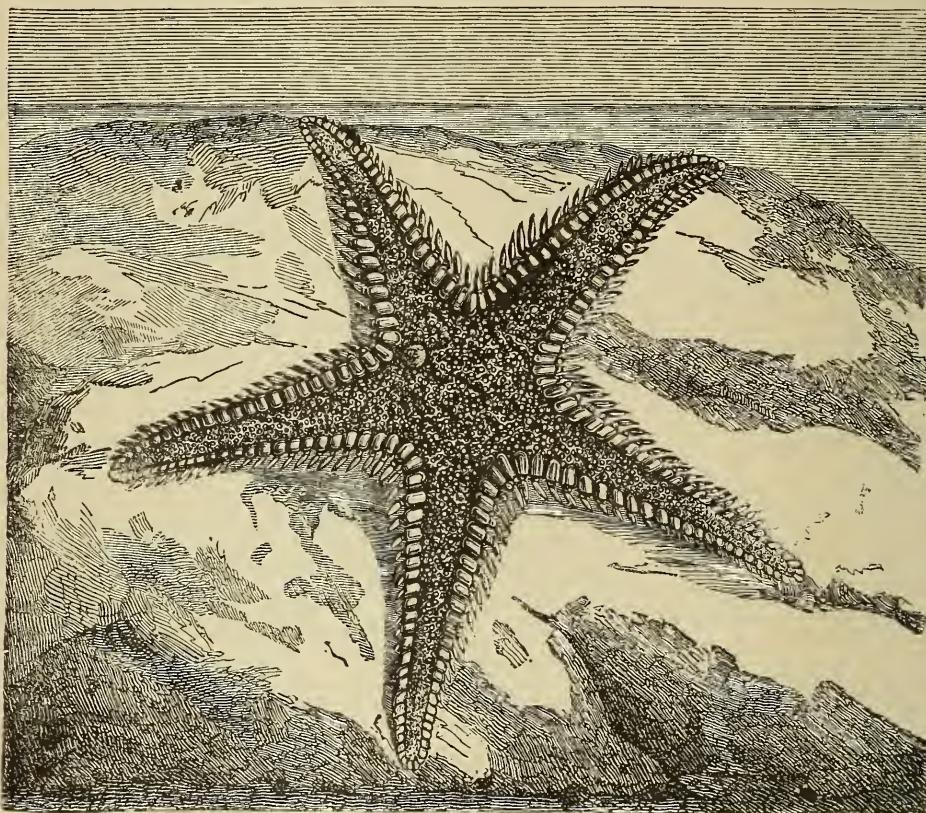
On the next page is a picture of another relation of the pretty Stone Lily. It is a Star Fish, and he belongs to a curious and beautiful race, almost the only one which is known to commit suicide. Let him but suppose that he is going to be caught, or taken from his beloved sea water, and he will throw off his arms, and fall into a dozen pieces before your eyes.

The picture is of the common Star Fish, but there are many kinds, some of them having long feathery looking arms, and being very beautiful creatures indeed. This one, however, though not particularly pretty, is a very curious creature. It is curious to see it walk along the sand, which it does with the aid of a great number of tiny feet which it has. It not only walks easily, but sometimes it stands on the tips of its arms, with its body held up, and looking like a five-legged stool.

Star Fishes live on mollusks and are especially fond of oysters. But oysters don't care to be eaten, and when a hungry Star Fish tries to eat them, they shut up their shells and defy him. He is not easily discouraged, and if he can't get the oyster into his stomach, he goes to work to get his stomach around the oyster. Sometimes indeed, he swallows the animal whole, shell and all, and after dissolving out the oyster he throws out the shell. There is a

specimen in the British Museum, of an unhappy Star Fish who was unable to get rid of the shell he had thus swallowed, and there it sticks to this day.

But to tell how he gets his stomach around his prey. He first lays himself down on his victim, and folding his five arms around it, he holds it firmly in place. He then begins to push out his own



stomach through his mouth, and wraps it around the unfortunate oyster. Whether some fluid of the stomach makes the shell open, or exactly how it is done, is not known, but the result is the death of the oyster and a dinner for Mr. Star Fish.

Some naturalists say that the Star Fish has eyes at the end of his arms, while others do not agree to it. But they all agree as to the wonderful way in which one of these creatures will reproduce

his organs. Tear one in two, the missing parts will grow on each half, and there will be two Star Fishes instead of one. Tear off the arms, they will all grow, and even a solitary arm will grow a new set of arms and a body all complete.

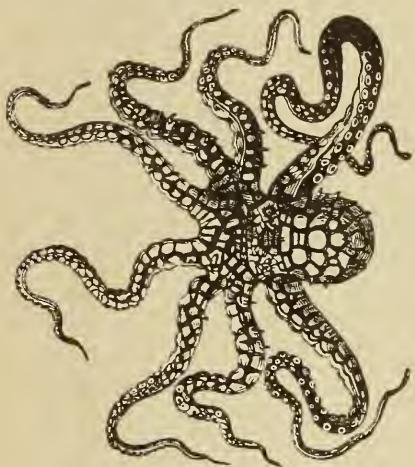
But there is one way of killing a Star Fish instantly and completely, and that is to throw him into fresh water. He is dead in a second. So the problem with naturalists who want perfect specimens, is how to get him into fresh water before he gets out of salt water ; for if he is out for an instant, he is very apt to throw himself to pieces before you can wink.

Some of the Star Fishes—especially of the kind called Brittle Stars, which have long slim arms starting from a round body—are very pretty objects for a cabinet.

## HUGGED TO DEATH.

Can you imagine how a spider would look five feet high?

"Ugh!" did you say? Well, you'd say it louder and more emphatically if you could see the creature that looks like a spider when he takes a promenade on the bottom of the sea. You can see in the picture that he's no beauty, but fancy him walking on the tips of those eight horrid arms—or legs—of his, with his head hanging down.



like the bill of a parrot. Sticking out every way from his body, like the rays of a star, are eight horrible arms. These arms are flat and tough like leather; indeed, the whole creature has hardly a bone in him. There are three rows of suckers the whole length of each arm; as many as a thousand in one *Octopus*.

Some of the suckers are as large as an egg-cup. When he seizes anything with his arm, every sucker fastens itself tightly to the victim, and there's no way to get them off, but to cut off the arm itself.

His eyes—which stick out—are large and yellow, and have a very ugly expression. He changes color when excited, and he carries bags of ink, with which he can discolor the water all around. If he loses an arm, he don't have any trouble about it, for another one grows out.

I'm sure I'm glad he has to stay in the ocean, and can't come up on land, for I have no wish to see him. It's bad enough to read about him. He isn't obliged to walk; he can swim, by opening and shutting his arms, and contracting and expanding his body, or he can climb the rocks as a fly can climb a wall, with perfect ease. He is called by fishermen a Mansucker, though in the books his name is *Octopus*.

He is an odd looking creature. In the centre is a round body, nearly all mouth, armed with a pair of mandibles

He doesn't seek food ; he lies quiet in the water, with his body perhaps under a stone—for he can squeeze himself flat as a pancake—and his arms floating carelessly around. Then he looks exactly like certain plants that grow in the sea, and the fish never notice him. But the instant one of them touches either of the dreadful arms, it fastens on him, drags him up to the creature's mouth, and crams him in.

I told you he was called a Mansucker. That is because of a habit he has of winding his horrible arms around a man if he chances to bathe in the neighborhood. If the unfortunate bather has no weapon to kill him, or cut off his arms, he is sure to be hugged to death.

Sometimes this interesting monster makes himself into a web, something like a gigantic spider's web. He goes among the stems of a plant that grows in straight long stems, and winding one arm around one long stalk, he stiffens out the other seven, so that he looks just like the plant stems, and the fishes, not seeing what it is, are easily caught.

His scientific name *Cephalopod*, means head-footed, because his legs (for they are legs as well as arms, you know,) come out of the head.

It isn't a very pleasant idea to us, but the Indians of North America, who live on the shore, are fond of eating this monster; and to catch him, and not have him catch you, is a delicate job, I can tell you.

The Indian is very cunning about it, and this is the way he does it. He paddles around in his canoe, looking carefully through the clear water till he sees one of the creatures with its arms stuck out, waiting for its breakfast. The Indian has a spear ten or twelve feet long, with a dreadful cluster of hard wood spears with barbs on, at the ends. He now cautiously puts the spear down through the water till it is only about an inch from the body of the *Octopus*, and then sends it crushing down into him.

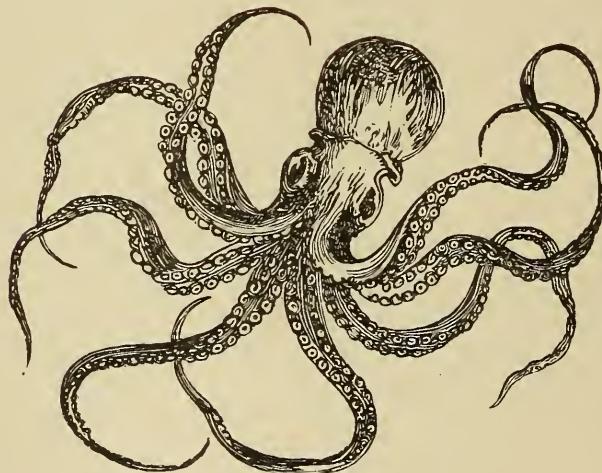
Of course his first action is to grasp his tormentor, so he winds his horrid arms around the pole. The Indian holds him carefully off, for if he could reach the canoe with one arm, he could tip it over in an instant.

But he isn't dead yet, so the Indian draws him out of the water, then taking another spear, smooth and sharp, he stabs the creature where the arms join the body.

That seems to take the strength out of the arms, for they fall off, until at last the Indian drags him dead into the canoe, looking like a lump of brown jelly.

The Indian takes it home and roasts it. I don't know as it's any worse to eat him, than to eat a lobster, but I don't care to try it, do you?

The eggs of the *Octopus* are found in clusters, and look so much like branches of dark colored grapes that fishermen call them sea grapes. The bone that you put in the canary bird's cage came out of one of these Cuttle Fish, and is the only bone he has.



*A WALKING STOMACH.*

It doesn't resemble a stomach, I must admit ; it looks more like a little plant. Here it is. The small figure (No. 2) is the creature



the size of life, while the large one (No. 1) is as it looks under the microscope.

The name of this strange and wonderful animal is *Hydra Viridis*, and it lives in ponds and ditches, either attached to the under side of the leaf of a water plant, or to a bit of floating wood. It is not always attached to something, however. It can walk about, though not very nimbly, and it likes best to hold on to the shell of a fresh water snail, and thus get carried about.

It is said the creature has no eyes, yet it is sensitive to light. It has no brains, and no nerves, yet it lies in wait for its prey, flies from danger, and fights its enemies. What a wonderful thing, indeed!

We should have known very little about this queer creature, but for the study of one man. About a hundred years ago he became interested in them, studied them, experimented on them, and finally wrote a book entirely about this little atom of a Polyp.

One of his experiments was to turn it inside out, which he did by means of a worm, and a bristle. The worm he gave the little fellow to eat, and when it was swallowed he gently squeezed the body of the Polyp, which pressing the worm against the mouth, made it open. When the worm was partly out, so as to keep the mouth open, he took a bristle which was not sharp, and pushed the end of the body up till it went out at the mouth, and thus it was exactly inside-out. If let alone, the astonished creature would after a while get back, but if fastened so that it could not, it would soon get used to its new way of life, and proceed to eat and grow as usual.

He kept one in this inside-out state for two years, and it was healthy and flourishing.

The *Hydra* feeds itself by seizing its prey with those long arms, and stuffing into its mouth. It will eat anything. Sometimes the little worms which it swallows will try to get out, and how *do* you suppose it keeps them in? I'm sure it's the drollest way you ever heard of. It simply thrusts one of its own arms into its stomach and holds the struggling worm till it is digested—or at least, dead.

The strangest thing about it, perhaps, is its way of increasing its family. There are, in fact, three ways ; one by eggs, like other creatures ; another by throwing off a part of itself—like an arm, or a part of an arm—when the discarded part will at once proceed to grow on all the organs of the perfect Polyp. But the third way is the one the *Hydra Viridis* goes to work. It is by budding, like a plant.

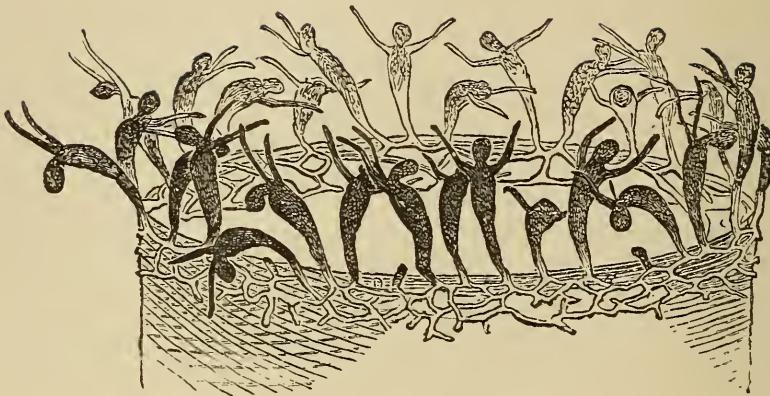
Look at the picture. You see on one side of the creature, a smaller one with body and arms all complete. That is the baby *Hydra*, and it lives there, eating and growing, till it is big enough to take the whole care of itself, when it becomes detached from its mamma, and goes off by itself. The naturalist who wrote so much

about them, says that when the time comes for the little one to set up an independent life, the child and the mother often combine to separate themselves, fairly pulling themselves apart.

Sometimes, too, the little one will have its own little buds growing up to be Polyps, before it leaves its mother.

All these things so surprised the discoverer, that he began to think perhaps the creature was a plant, so he made some more experiments. He cut one of them up into five or six parts, and watched them. In a few days, every part was a complete animal. He sometimes cut one in two, so that the end of the stomach was cut off. Did that disturb the *Hydra*? by no means! it was just as greedy of food, hunted just as actively for something to eat, and stuffed it as complacently as ever into its mouth—though it at once dropped out the other end.

I think he's about the coolest individual I ever read of.



### WHAT ARE THEY DOING?

Did you ever see such a droll performance as you see going on in this picture? There seems to be a party of little fellows on the edge of a tube, throwing themselves about in the wildest way, flinging their arms, and bending their bodies into arches. They seem to be mourning and lamenting about something that has happened down in that hole. I should think they had lost all their friends down there. Here's one in front, who actually seems throwing himself off backward in his despair.

They are the strangest creatures we have seen yet, and I must tell you all about them. To begin with, they are not so big as you see them in the picture; that is the way they look through a microscope. In fact, they are only one fortieth of an inch high—that is about as tall as one of the periods used in this page. You could not see them very well, you perceive, without a good instrument.

They are alive, and they are Polyps, of the same family as the *Hydra* that I was telling you about. Around the edge of the tube you see a sort of network, that is a part of the creatures, and from that they grow. The arms which they fling about so restlessly are their tentacles, and the heads can be opened wide as you open a book. They have mouths and stomachs, and so must eat and live.

The tube on the edge of which they stand, is the home of a curious little fellow, which I will tell you about in a minute. When he sticks his head out, these wild creatures on the edge are quiet and rest against him, but the moment he goes into his house they commence their strange performances.

The interesting little fellow, who lives in the tube, belongs to the family of Tube-building Worms, and his name is *Sabella*. His whole tube—or house—is not more than four inches long (and he is not an inch himself) and of course, it is not more than an eighth of an inch across, though it looks so large in the picture.

Little as he is, he has some curious ways. To begin with, he always builds his own house, and he would be as uncomfortable without one as you would. All his family build houses, though no two branches of it use the same material—some using sand, others mud, and still others preferring a hard shelly substance. They have often been made to build in an aquarium, and so the whole process is made known, and the description of one will do for the whole.

When the little fellow wants to add to his house, he first proceeds to collect materials by means of his numerous tentacles or arms. He then takes the substance, whether grains of sand or atoms of mud, one by one up in those arms, lays it on the edge and cements it there, where it soon hardens. Not having hands, perhaps you wonder how he manages to lift a grain of sand. Nothing is easier—or more wonderful. He can fold together the tiny atom of a tentacle, not turn up the end, but fold together from side to side, so he can take up a grain of sand anywhere on the whole length of each little arm. All his many arms work together, and it is surprising how rapidly he adds to the length of his house.

That is not the only curious thing about the tiny mansion. When he began to build, he was a baby and only needed a small house, so it is very small at the end where it is fastened to a stone or shell. But as he grew and wanted to get out of the nursery, he built on a larger addition, and thus his tube gradually increases in size till it is right for the full grown builder.

When this little fellow builds in an aquarium, it is interesting to give him different kinds of materials and see what a droll sort of a house he will make.

Now you know about the house, I must tell you about the little fellow himself. He is nothing more nor less than a short

little Worm, with very beautiful tentacles, or gill-fans. The *Sabella*—who has all the polyps about his door—has a crowd of feathery tentacles, and the *Serpula*, another tube building cousin, has elegant gill-fans. When the creature comes to the door, he pushes out these beautiful appendages and spreads them out in their full glory in the water. The object is the same in each one, to breathe and to get something to eat.

The feeding is a curious process, consisting in keeping up a current of sea water into the creature's mouth. The current is kept up by the motion of a part of these spreading organs, and as the water rushes in, he seizes what is good to eat, and the rest goes through and serves the useful purpose of washing out his house. So he gets his dinner and cleans house by the same operation.

This performance you can see, if you have any of the family in an aquarium—provided you are very still—but move about, or even raise your hand, and down goes the beautiful creature into his house, shutting the door behind him, if he is one of the kind who has a door. I must tell you how he manages to get out of sight so quickly; the whole thing has been found out by these untiring fellows with microscopes.

To get up to the door of his house the little creature has a set of pushing poles. They are stuck out through some warty looking objects on his body, one row on each side. From each projection comes a bunch of stiff spear shaped bristles, twenty or thirty in a bunch, and they push against the membranous lining of his tube, thus carrying him easily to the door.

But going back is quite another matter; he can take his time in coming out, and he does usually, but he wants to go back like a flash, if he thinks there's danger abroad. For this purpose he has the most astonishing arrangement, no less than ten or twelve thousand hooks on his little body, which all act together and instantly. No wonder he can shoot into his house so quickly that you can not see him. What wondrous provision for the safety and comfort of one little worm less than an inch long!

I told you the little creature could shut his door, and so he can—if he's one of the *Serpula* family—but I haven't told you about the door, and that is as interesting as anything about him. What we call the door, is in fact a stopper, like a cork, and when the gill-fans are out, it hangs at the side of the tube, at the end of a slender thread-like arm. But when they fold up and shoot in, the

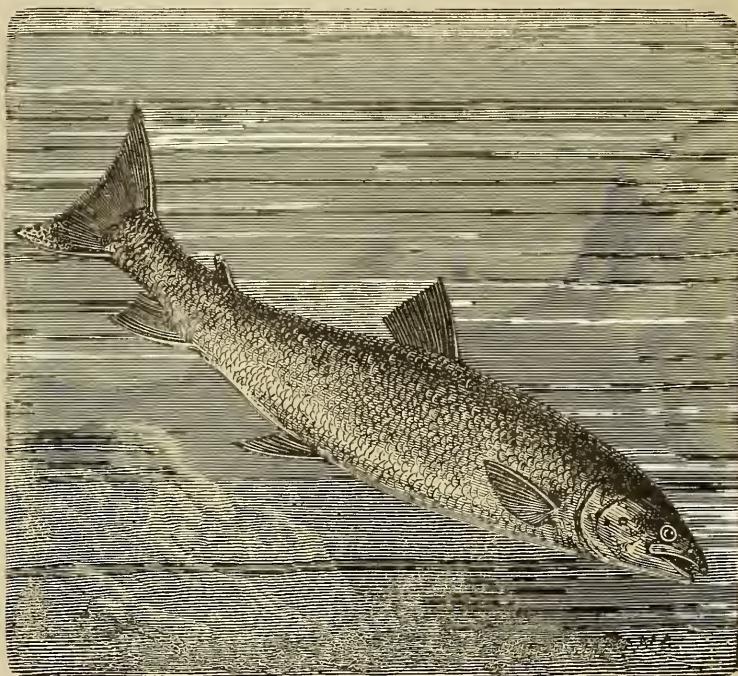
stopper jerks into its place too, and stops the door completely. The arm or tentacle on which it is fastened is a little longer than the gill-fans, and so it is easily held in place.

It is no common stopper either; it is as highly ornamented, and as highly colored, in many cases, as though it was the only beauty belonging to its owner. In some, it is an elegant scarlet color, others have horns on; one kind is furnished with spikes, and another has ridges; one is conical in shape, while the next may be flat and round. But the strangest door of the whole, is a sort of a three storied concern, which looks—some one says—like the tower of Babel (as seen in pictures.)

Most of the Tube-building Worms are sociable, and build in groups, some of them all twisted together, and others straight and erect. When the curious little creature is ill, he doesn't retire to his bed as men do, he comes out of his house and dies on the ground outside.

*CRADLES FOR BABY FISHES.*

You don't believe fishes have cradles? Well, you wait till I tell you about it. Perhaps you don't believe they go up ladders either, but they do for all that, and there are several odd things you'll have to learn about these funny fellows; that is, if you like to read true stories, and don't skip these that I'm going to tell you.



The Salmon—the fish in the picture—though she lives in the ocean, doesn't think it's a very safe home for her babies. And indeed she is quite right about it, for there are so many big fish in the ocean, who are fond of Salmon, that not one in a thousand would ever grow up.

So the wise Mother Salmon takes a journey every season, into a fresh water stream, and away up as far as she can get, to find a nice, safe place for a nursery.

When she finds a place to suit her, she digs a little hole in the ground on the bottom of the stream, lays her eggs in it, and carefully covers it up. Then she goes back to her home, confident that her babies will flourish, have a fair chance for life, and when grown, will join her in the ocean.

Well, Salmon are very nice to eat, as you probably know, and the people who lived on the streams liked to catch them of course, and as villages grew up on the river, and men built dams, and turned sewers into it, the Salmon found she couldn't get up the dams, and she didn't like the flavor of the water, if she could, and gradually Salmon have been getting scarcer, till men began to fear they would disappear altogether.

So some wise men put their wits to work to make it easy for the fish to get up the stream, and the way they took was to build ladders at the dams. Salmon will leap up small falls, and a Salmon ladder is merely a kind of a flight of steps, over which the water runs. The fish leaps from one step to another, and so goes up.

But they had become so scarce that people had not only to make ladders, but they had to take care of the eggs of young fish—make cradles in fact, where the eggs could be protected from other fish, from ducks and other water-fowl, and from all enemies.

A fish nursery is a curious thing to see. In the first place the cradle of the fishlets is called a hatching-box, and is made in several ways.

Perhaps the best is in use at a "fish farm" in Huningue, France. It consists of a set of troughs, each one higher than the next, into which fresh water constantly flows.

When Mamma Salmon comes into the streams to arrange her nursery, the fish farmer catches her in a net, and gently persuades her to trust her eggs to his care. So she leaves them in the place he has provided, and the farmer puts her back into the stream, and she goes back into the ocean, half scared out of her wits, I dare say.

The eggs are carefully spread out in the cradles I spoke of, and left to hatch out. They require some weeks, but shad, which are raised in the same way, in our country, hatch out in two or three days.

When the little fellows come out of the egg, they are funny looking creatures, less than half an inch long, and not much more like a fish than you are. But in two or three months they get to be

an inch and a half long, and after a while they grow to look exactly like their mother.

How would you go to work to feed these tiny creatures? The men—nurses, aren't they?—feed them on beef's heart chopped fine enough to go through a sieve, and when they are bigger, say six months old, they can have different food. So they have curd, and what is called the fly-worm, which they get by hanging meat over the nursery; the fly-worms fall into the water, and the fish eat them.

As soon as the fishlets are big enough to take care of themselves, they are put into a pond and left to grow. But the time comes, in a year or two, when the fish feels the irresistible impulse growing on him, to push out into the world for himself, and they will crowd around the gates of their little ponds, till the farmer opens them, when out they go to the ocean.

One curious thing about them, is that they always come back to their own nursery to make a home for their babies. So when a river is exhausted of fish, it is only necessary to hatch out in ponds, a lot of fish, and put them into the river. They will go to the sea, and when the time comes, they will all come back. So the stream will be filled again.

There are several fish farms in America, and hundreds of thousands of fish are put into our rivers every year.

You can raise fish for yourself, if you like. It is no more trouble than to keep gold fish, and a thousand times more interesting to watch. You can buy the hatching-boxes, or have them made, buy the eggs of some professional fish farmer, and start your nursery. If you have a pond, you can in a year—at small cost—stock it with brook trout, the most delicious fish in our country, if not in the world.

Shad, another nice fish, are much less trouble to bring up by hand, than trout.

They hatch out in two or three days, and when three days old will take to the middle of a river, and take care of themselves.

Perhaps the time will come when we will raise our own fish, as we now do our potatoes.

*SALMON FISHING AT KETTLE FALLS.*

Why Kettle Falls, I'm sure I don't know. It's an ugly name for a very pretty waterfall in the Columbia River.

Of course you all know that the Columbia River runs through a wild part of British America, where very few white people are found, though there are plenty of Indians. Well, the winters, as you would expect, so far north, are very long and cold, snow lying deep on the ground for at least six months of the year; and the poor Indians would perish with hunger, when the birds fly to a warmer climate, the bear goes to bed for the winter in their curious snow-houses, the beavers retire to their snug homes and bark diet, and all other animals hide in the warmest corners they can find, but for a wonderful event, which takes place every summer, and of which they avail themselves.

Perhaps you do not know that in June and July there is a great rise of the Columbia River, as well as of many other rivers, and all the Salmon in the sea take a summer trip up into them. On they come in a perfect rush, as soon as the water is high—as I told you in the last story—to make their nurseries in the fresh water.

Well, the Indians depend on their summer fishing for their winter food, and so, about the time the Salmon are making preparations for the trip, the dusky natives appear on the scene.

When an Indian travels, he does not take a valise in his hand, bid his squaw and pappooses good bye, and step on the cars, as we do. No, indeed! a journey is a much more serious affair. Everything is pulled up and carried along, bag and baggage. Wigwam, skins, dogs, horses, and children go with him on his journey—in fact, every article he possesses is taken.

You may imagine there are some odd sights to be seen in these caravans, which stream in from every quarter as the fishing season approaches.

The youngest children are packed on horses with the baggage, while the older ones ride behind on other horses with the squaws, three or four on a horse. The men and big boys drive the loose horses, of which these Indians always have a drove.

Did you ever see Indian horses going to be watered? I must

tell you about it. A man or boy mounts the swiftest horse, and, taking a bell in his hand, starts off at a full gallop, ringing the bell as hard as he can. As soon as the rest hear it, every horse instantly starts on a run, as if he were mad. On, on they fly, in a wild, mad scramble, over bushes and through mud, each frantically striving to be first. It is a fearful troop to meet in a narrow road, you may be sure; for I don't know as anything short of a bullet would stop them in their mad career.

When they reach the water, and the bell is quiet, they all drink, and then they are led back in the same frantic way.

But to return to our Salmon-fishing. As soon as they arrive, the squaws set up the lodges, and get everything into house-keeping order, while the Indians prepare for the fishing. Some build drying-sheds on the bank of the stream, others cut down huge trees, trim the branches off, and drag them to the rocks, where they hang over the falls, and are fastened there by immense stones.

They look like giant fishing-poles, which indeed they are, for from them hang the baskets which are pitfalls for the poor fish.

You may think they are pretty large fish-poles, and so they are; but I'm afraid you'll open your eyes still wider when I tell you that the baskets which the Indians make are *thirty feet* in circumference, and twelve feet deep—as large as quite a respectable bedroom; and I assure you I am telling the simple truth.

These huge baskets are hung by ropes of bark, with much labor, to the poles, and fixed near the rocks, yet where the water of the fall will rush right into them when the river rises.

When all these arrangements are completed, a watch is set to announce the arrival of the fish. With the first fish commences busy work. The Salmon are so thick that you could scarcely put your hand into the water and not touch one, and when they reach the fall they all try to jump over. But it is a long jump, and many fall back into the baskets, where they meet with a warm reception, for no sooner do they touch bottom, than the Indians, of whom there are several in the basket, seize them, kill them instantly with a club, and throw them out on the rocks. Between two and three hundred fishes are usually thrown from each basket in a day. Some of them are large enough to weigh seventy-five pounds. The Indians, who are in the baskets, stand under the fall of water, you must remember, and of course they have often to be relieved during the day.

But let us follow the dead Salmon to his grave. From the rocks, where he is thrown, he is dragged by the children to the squaws, who are seated, knife in hand, near the drying-sheds. There he loses his head and back-bone under the skillful hands of the squaws, and then he is a very limp and helpless affair indeed, and makes no resistance to being strung on a long pole, and hung under the shed in the smoke of a continual fire.

When he is thoroughly dry and brown, he and all his brethren are taken down and packed in bales, and divided among the men. They are then packed on to the horses, and lodges are pulled down, guns shouldered, children mounted, and off goes the whole caravan homewards. Two months of hard work thus supplies each family with food for the long dreary winter.

*LITTLE LIVE CANDLES.*

Perhaps you'll laugh at the idea of candles coming out of the sea,—live ones, too. And I fear you'll hardly believe me, when I tell you that not only candles, but quart bottles, can be had for the gathering.

I want to tell you how the Indians, who live on the shore, get their supply of light for the winter evenings, and I may as well confess at once, that the candles are small fish, so very fat that they burn readily.

The Candle Fish are very fond of coming to the top of the water when the moon shines, so, on moonlight nights the Indian goes out in his canoe, and very softly steals up among them. He holds in his hand a sort of comb, big enough to be great-grandfather to common combs. The teeth are made of sharp bones, or pointed nails.

When the Indian gets among the pretty fish, playing in the moonlight, he sweeps his tremendous comb through the water with all his strength, bringing it up half full of fish, sticking to the dreadful teeth. Holding it over the canoe, he gives it a rap, and the fish fall off. Thus he keeps on till his boat is full of the silvery little fellows.

The next thing is to dry them, and this the squaws do, by stringing them on to a stick, running it through their eyes, and hanging them up in the wigwam to dry and smoke.

The upper part of an Indian wigwam is the best place in the world to smoke things, for it is always thick with smoke. When the beautiful little fish are all dry, and shrivelled up, the squaws take a long wooden needle, threaded with a stringy bark, and draw it through the fish from head to tail. That is for the wick, and the fish is so fat it will burn like a candle.

Not all of them are burned, however; the Indians like them to eat, and when they have enough laid up for that purpose, they make oil of the rest, by heating and pressing.

Then comes the need of something to hold oil, and, as I have

said, they have only to gather them out of the sea, to have all the quart bottles they want. These vegetable bottles are the hollow stems of a water plant, which grows very large, and near the root swells out into a natural bottle. The Indians cut off the stem, fill them with oil, and cork them up.

There is another article of food the Indians get from the sea, only the squaws have to get them, for an Indian thinks it beneath his dignity to do so. I never heard of any of them refusing to eat them, however.

How do you think it would feel, when you were lying quietly in bed at home, to have a big stick pushed under you, and all of a sudden be jerked up through the top of the house, out into the light, and then be seized by a big red giant, and thrown into a horrid basket, with other stolen children?

That's just what happens to the poor little Clams, who live in the sandbank on the sea-shore. When the water is over the sand, Mr. Clam buries himself two feet deep. By-and-by the water goes back, and leaves the beach bare. Now, if the Clam would only keep quiet, he could never be found; but he has a funny fashion of spouting up little jets of sea water, several inches high.

The squaw takes a long stick and goes after him. When he spouts up the water, she pushes the stick under, and just prays him out, then grabs him, and throws him into her basket.

I don't suppose he's much frightened at first, for he has a good strong shell, like an oyster shell, you know, and he just shuts it up, certain that no one can open it. No knife can get in, and he's almost as safe as if he were locked up in a big castle.

But that don't worry Madame Squaw. She knows a very cunning trick to make the gentleman open his shell. She merely lays him carefully on a pile of red-hot stones, and sits down, with a sharp stick in her hand, to wait till he chooses to open.

She don't wait long, for the heat soon goes through his shell, and Mr. Clam finds it intolerably close.

"Whew!" he says to himself—at least I suppose he does—"this is getting a little too hot! I don't hear any noise, and I guess the red giant has gone away. I must have a sniff of fresh air."

So he opens his shell a little, when wily Madam Squaw just pushes her stick into the door, and he can't shut it again. Then she takes a knife and gets him out—dead, of course.

When she has a pile of them, she takes a long wooden needle, with a string for thread, strings them just like dried apples, and hangs them up to smoke in her smoke-house—the top of the wigwam.

Madam Squaw has to prepare a good many strings of dried Clams before summer is over, or else she and her babies would starve in winter, and they don't like starving any better than you do, if they do eat such horrible looking things.

I suppose you'd *almost* starve before you could eat the dried Clams, for white people, who have tasted them, say they taste like old rope, flavored with tar. I don't believe you'd like that very much.

## THE FISH THAT BUILDS A HOUSE.

You never heard of such a thing? Well, I mean you shall hear all about it in two or three minutes, for he's as funny a fellow as I know anything about.

His name—according to the wise men—is *Cottoidea*, but the rest of the world call him Stickleback. I think one name is about as bad as the other.



He not only builds a house, but he takes care of the babies himself, which is even more extraordinary.

Mrs. Stickleback has a very easy time. She doesn't help her husband build the house; indeed he never thinks of a wife, or if he does, he don't speak of it, till he has the home ready. After she

has laid the eggs, instead of letting her take care of them as other mothers do, he just drives her out of the house, and won't even allow her to see the babies.

There's one good thing about it, though; she don't seem to care much. She swims off and has a good time, while Mr. Stickleback scarcely ever leaves the house.

It's as much as any other fish's life's worth to pass the house, for Mr. Stickleback will rush out and give battle at once.

It is curious to see them fight. The only weapons they have, are sharp spines, or bones, sticking up in their backs, (that's why they have such an outrageous name, you see,) and the thing they try to do is to dive under the enemy and stab him from below.

So they both dive, and the result is, that they oppose each other with their noses, and they often flap around a long time, nose to nose, neither of them able to get under.

The moment one gets his nose the least below the other, he dives, and tries to stab, but if the enemy is quick enough, he will instantly rise and avoid him. They are plucky little fellows, and hardly ever stop till one is dead.

I must say, in excuse for Mr. Stickleback that he has reason to be suspicious of prowlers, for other fish are very fond of eggs, to eat, and it would be a poor father that wouldn't preserve the little ones from such a fate.

Let me tell you how he builds his house.

To begin with, he lives in a river, and he selects a nice place among the plants that grow in the stream, where there are good strong stems to build to. First, he bites off bits of green from other plants near by, and fastens them to the chosen stems with a gummy material he has about him. When he has enough of these funny green bricks for a floor, all nicely glued together, he goes to the bottom of the river, and brings up a mouthful of sand, which he scatters over the foundation. He continues to bring sand till the little platform is weighed down, and made steady in the water.

Then he proceeds to build, with more green bricks, the sides and top of his house. When done, it is shaped something like a barrel, smooth and strong all over, about the size of a man's fist. He even plasters it, by constantly rubbing himself against the inside wall, thus rubbing off the sticky stuff from his body. It wouldn't be very nice plaster, if it remained sticky, but it soon hardens, and looks like varnish.

Then he makes two doors, one at each end, round and smooth, and just big enough to go in nicely.

When it is all done, and not before, he hunts up a wife, as I told you. And from the day she comes till the eggs are hatched, six weeks, he watches, and fights, to keep them safe.

Perhaps you think he'd have an easier time if he had but one door to guard, but there's a very good reason why he must have two doors, and always keep them open. Fish eggs must have, to hatch them out, not warmth like hen's eggs, but running water all the time.

Besides keeping away enemies, he has to turn the eggs over, now and then, so that the water will get to the under ones, for I can tell you he doesn't take this trouble for a dozen or two babies, but for hundreds and thousands of them.

They are a droll sight, when they are all hatched out, and Papa Stickleback has more trouble than ever. For besides guarding them, he has to keep them in the nursery. They like to get out as well as boys and girls, and the poor papa has to swim after them, and bring them back in his mouth.

I wonder if he slaps them with his flat tail when they're naughty.

You can easily see, that with such big families, plenty of Stickleback babies grow up, and in some rivers they are so thick that one can dip them out in a bowl.

*STORY OF A FOREIGN VISITOR.*

It is no Grandee with great string of servants that I mean, but an individual you all know very well, who has been in your house, and at your table (*on* your table, perhaps I ought to say) dozens of times.

Some of you don't like him very well, and I must admit that when we see him flattened out and sprawled wide open, dry and salt as he can be, he doesn't look as if he was anybody in particular.

But he was once a very lively resident of the coast of Labrador or New Foundland. There he spent his summers with thousands of his friends and relatives in a most delightful manner, for like other fashionables, he had his summer resort.

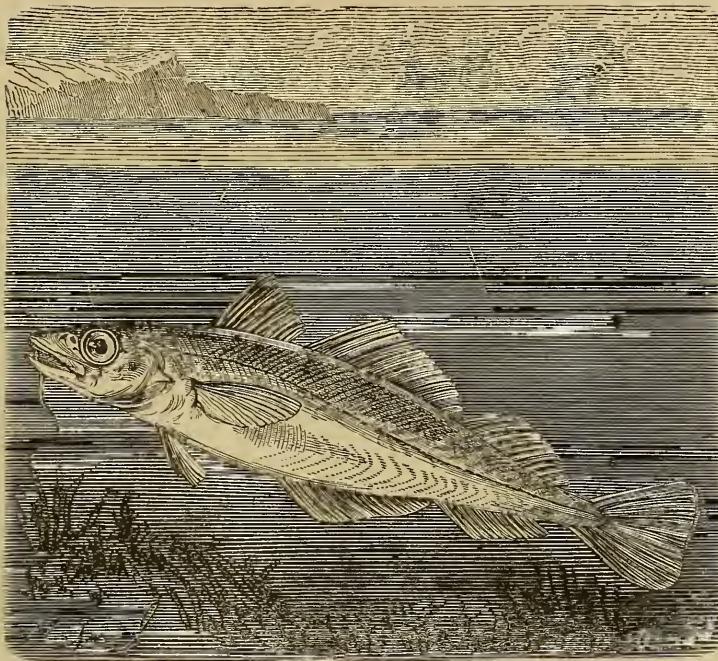
There he might have lived happily till this day, but unfortunately his flesh is good to eat, and so every summer, hundreds and thousands of vessels fill up with salt and barrels, fish hooks and lines, bait and men, and spend the whole summer enticing the innocent members of this family into their vessels, where they meet with most uncivil treatment, and become the flattened out fellows we buy at the grocery.

Cod fish? Yes, of course it's a Cod fish, though why we should say "Cod fish" any more than "trout fish," I'm sure I'd like to know.

I must tell you about this hunting. When the boats get into the neighborhood of the fishing ground, everything is made ready. Each man has three or four feet of the edge of the vessel for his use, and his line is all ready on a reel, while barrels of bait stand handy. Think of needing *barrels* of bait, you boys who carry all you want in a tin spice-box!

The bait, too, is different from yours. Sometimes soft-shell crab, sometimes small fish, which they catch in nets, and again, chunks of the Cod themselves.

The fish go in crowds—shoals, they call it—and the instant one is seen, every man springs to his place, and throws out his line. From that moment, as long as a fish will bite, they never leave their post. What they eat, if they eat anything, is brought to them by the cook.



The Cod are greedy creatures, and the men have only to bait the hook, and haul up the fish. Like other greedy fellows, they suffer for it, for they suddenly find a hook in their mouths, and in spite of their struggles they take a flying leap on the deck. The first thing that happens to them is to lose their tongues, for each man keeps an account of his fish by the tongues. Then they lie in heaps on the deck till the fishing is over for the day. Generally, after some hours hard work, the fish will suddenly leave, whether suspicious of the odd way in which their friends jump out of the water and return no more, or whether frightened by a larger fish, nobody knows.

Then every man puts up his line, and all go to work to dispose of their deck load. Tables made by boards resting on barrels, are stretched across the deck, and the men are divided into squads.

A nice time the poor Cod has before he gets through all these rough hands. Luckily, he's dead long ago, and don't care a snap what happens to him.

The first man, called by the suggestive name of a "Throater," takes a fish, cuts across his throat and down his body, and passes him on.

The next man, the "Header," snatches him up, pulls off the head and tears out the intestines. Throwing out the liver, he dashes the rest overboard.

The "Splitter" comes next, and, as you may guess, he cuts the wretched fish open from end to end, and cuts out the back bone. From this he removes the sounds, which are packed in barrels with the tongues, as a great delicacy. Then throws the bone overboard.

The fourth man is the "Salter." But before he operates, Mr. Cod, or what is left of him, has a good bath in sea water. The "Salter" lays them, back up, with plenty of salt between. There they rest for weeks, and that's the reason they're so exceedingly salt. Then they are spread out for two or three days to dry, and are ready to be packed.

It is said that a man can "head" sixteen thousand fish in a day. That's a pretty big story, but I suppose it is true.

They generally weigh about fifteen pounds, but sometimes as much as fifty pounds. Cod are not the only fish caught; sometimes a halibut will snatch the tempting bait, and then three or four men will have to help draw his solid two hundred pounds on deck.

The liver, which I told you they saved, is made into cod liver oil, and I wouldn't advise you to go and see it done, unless you like strong odors, and never expect to take cod liver oil.

There is one curious thing about Cod fish. When taken just before a storm, they are invariably found with big stones in their stomachs. In a large fish it will weigh several pounds. No one knows why he takes such a solid meal, but the fishermen think it is to anchor him during the storm and swell of the sea.

When the sea is quiet again, I wonder if he stands on his head and lets this funny anchor roll out again?

There's a Cod fishery on the banks by the Færoe Islands, where are caught fresh Cod for the London market. To get them home fresh, vessels are welled, that is, a large tank occupies the middle of it, and holes in the sides allow the water to pass freely through it. The best of the fish are put in, and they seem to do as well as if they had never been caught.

They often get quite tame on the journey, so that they will come and stick up their long smooth faces and big mouths, to take a crab or bit of meat out of one's hand.

*HOW ONE FAMILY EATS ANOTHER FAMILY.*

Who would ever think, to look at a black-skinned, dried-up Herring, that it was ever a bright, silvery little fish, darting about in the ocean! It is a wonderful change, but most anything would be wonderfully changed, after going through what he has endured since he was a playful fish in the broad sea; and he certainly is more useful, if not so pretty, in his present shape.

When I tell you that no less than fifty millions of his brethren are eaten every year, in the one city of London, I'm afraid we shan't dare to guess how many of the family it takes to supply the whole world, nor the size of the family that can bear such frightful losses every year, and still afford a supply next year. And that isn't the worst of it, for *our* family—the human family—have hunted and eaten the Herring family for nine hundred years! It almost seems as though the ocean must be full of them. It isn't, though, for there are months together when not a Herring can be caught, but when they do come, they come in immense shoals, so thick they are almost packed, and every man and boy on the shores where they come, who can buy, beg, or borrow a boat, goes out to catch them.

It is about August when these lively little fellows appear near the shore, and then it is curious to be in one of the fishing towns. Everybody who has anything to do with them—not only the fishermen, but the curers, the barrel makers, the salt dealers—begins to get excited, and at last they rush around like maniacs. "Good morning" goes out of fashion, and "Any fish this morning?" takes its place. Children buy candy with fish, and every one takes them in change, instead of pennies.

Of course all these millions of fish are not caught with hooks. Nets are used—monstrous ones too, fifty yards long, and thirty-two feet deep. A large boat will carry nearly a mile of these nets.

The boats go out at sunset, fix their nets, and stay till morning. Then they draw them in, and fill the boats with a monstrous mass of flopping, struggling fish.

At one port, often a thousand hogsheads of Pilchards and Sprat are caught in one day. Pilchards and Sprat, you must know, are baby Herrings. At least the wise men who know most about fish suppose them to be. Some of them you have seen, packed as tight as they can be, in small tin boxes, and called sardines.

But I must tell you what is done to the fish when the boat reaches shore in the morning. In some places they are first put into large troughs and sprinkled with salt. Then the curers take them, clean and throw them into huge tubs, with more salt. From there the packers quickly pack them into barrels. They are hardly ten minutes going from the boats to the barrels.

In other places the process is different. As soon as the boat touches land, men jump in with large wooden shovels, and shovel out the beautiful little fellows into wheelbarrows. They look very comical up to their knees in fish.

When a wheelbarrow is full, it goes at once to the salting house. A lively place that is, for there are hundreds of women and girls, making a neat stack of fish and salt, and—of course—talking and laughing as fast as they work. The stack is a big one, twenty feet long, four feet wide, and as high as they can comfortably reach. First—on the floor—a layer of salt, then a layer of fish, that's the way it's done. And when done, it looks funny enough—like a mound of salt, with tiny noses and tails sticking out all over it.

The little fellows are left here for five or six weeks, and no wonder they come out brown and withered up. I guess you'd be brown and withered up yourself, if you lay in salt for six weeks. The salt draws out the oil and water, and they drain off into places fixed for them. From this stack, the fish are packed in hogsheads, and sent off.

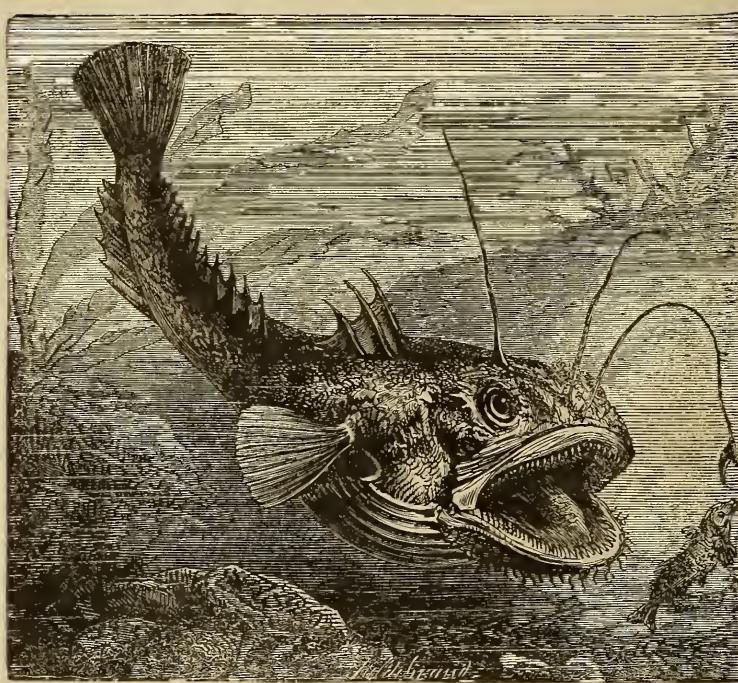
If the fish are little, and to be made into sardines, they are fixed in still another way. First, they are well washed in sea water, and sprinkled with salt. Then the heads are cut off, split open, and hung up to dry. After drying they have a short bath in boiling oil, and are laid on a grating to drain. From the grating they go into tin boxes, and when the boxes are opened, and a nice sliced lemon laid on the fish, I guess you all know what becomes of them. From the coast of Brittany, ten millions of boxes are sent every year.

Even the Indians who live near the sea-shore catch Herring.

But they do it with *traps*, not exactly like mouse traps though. At Puget's Sound, where the Indians gather in Herring time, there are great mud flats, which are left bare every day when the tide goes out. The Indians go when they are bare, and build long lattice work traps, where the fish can easily go in, but not so easily get out. When the tide is in, the water covers the traps, and millions of innocent little fish go into them. By-and-by the water goes down, and the poor little fish can't get out, but are left high and dry on the bank. Then the Indians go down and take them up in baskets and pails.

If you should want to visit an Indian fishing village, you would do well to leave your nose at home, for the odors of bad fish, rancid oil, Indians and dogs, *combined*, are too dreadful for endurance.



*SOME DROLL FISHES.*

This is a beauty, isn't it? What a graceful form, and pleasant eyes, and oh! what a mouth! Do you see that unhappy little fish, who thinks he's going to dine off that floating object above his head? Misguided creature! In about one second the world will turn dark, and he'll find himself safely housed in the stomach of the Angler Fish.

That interesting creature is sometimes called the Wide Gab, from the size of his mouth—a very appropriate name, I'm sure.

However, though his ways are not pleasant, and his looks are horrible, I don't suppose he is really any more vicious and cruel than the beautiful sea lily I told you about. He only hunts—or fishes—to eat, and that's what all of us do, up to man. He is not a swift swimmer, and nature has provided him with a fishing-rod and line, as you see. The end of the line has a bit of shiny mem-

brane on the end, which is the bait to the silly little fish, who never sees the big mouth behind it.

The Angler Fish is about a yard long, and is dressed in brown and white. He does not usually fish out in plain sight as in the picture. He buries himself in the sand, and waves his fishing line outside; so the little fish isn't so very silly, you see, after all.

This creature is found in the Mediterranean, and in some parts of the Atlantic ocean.

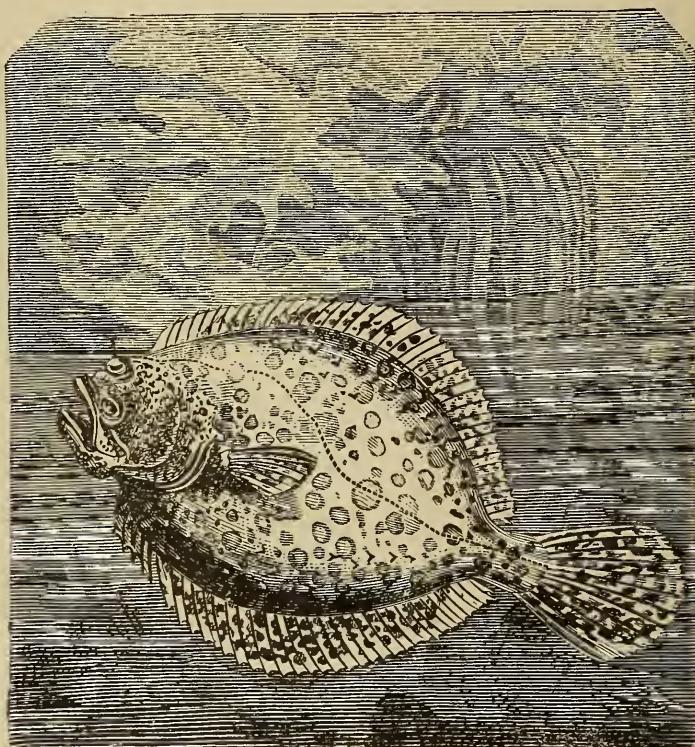
Here is another beauty! The Red Gurnard.



I havn't much to say about this solemn faced individual, except that he belongs to a family noted for their hideous forms, and the flaps of loose skin which adorn their heads, making them look as though dressed in beggars' rags. This one, I'm inclined to think, is the best looking of the family. One of its relations is so ugly

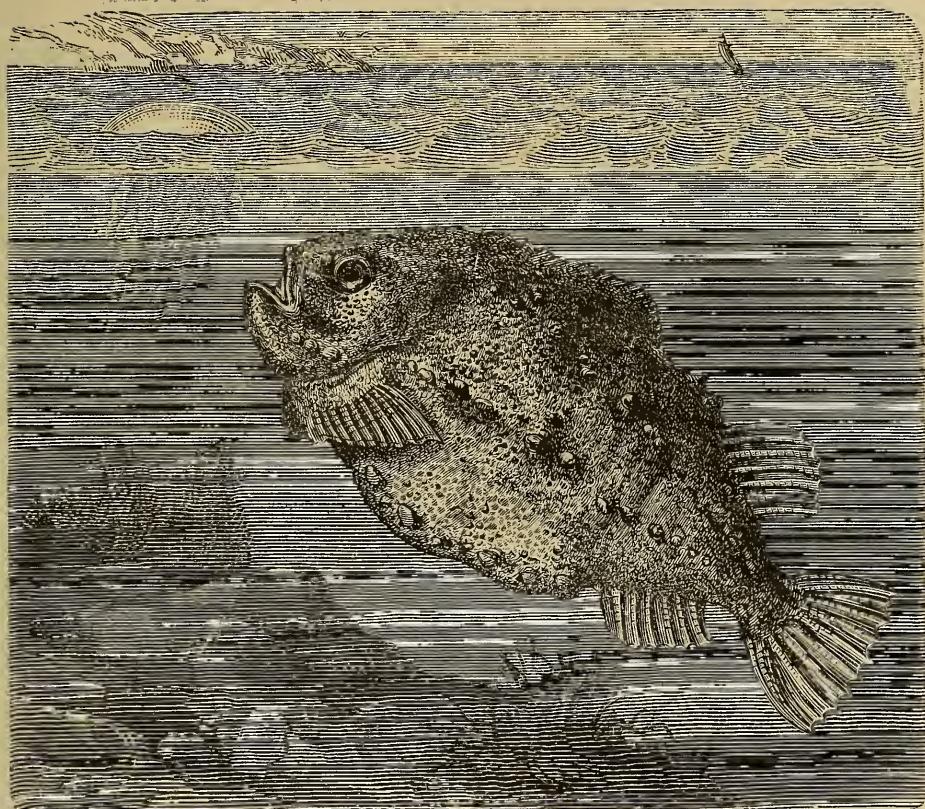
that the natives of the Isle of France call it the *Fi-Fi*, which means hideous.

But the one in the picture, to make up for his unpleasant looking head, is of a beautiful rose color, from whence his name—Red Gurnard.



I don't know as the last fish is much more disagreeable than this, the celebrated Turbot. It belongs to the flat fishes, and has both its eyes on one side. It is the special delight of the epicure, and always brings a high price in market. He is fond of staying at the bottom of the sea, and then has to be caught by line; but if he comes near shore, he is apt to meet his fate in a net. The color is brown, and he sometimes weighs sixty or seventy pounds, though they are found of all sizes from six pounds up.

The next droll fish I have to show you, is called the Lump Fish—and a very good name it is too—or the Sea Owl. Strange as it may seem, it is said to be a real beauty, because of its color. Blue is the principal color, but it is varied with sapphire and purple,

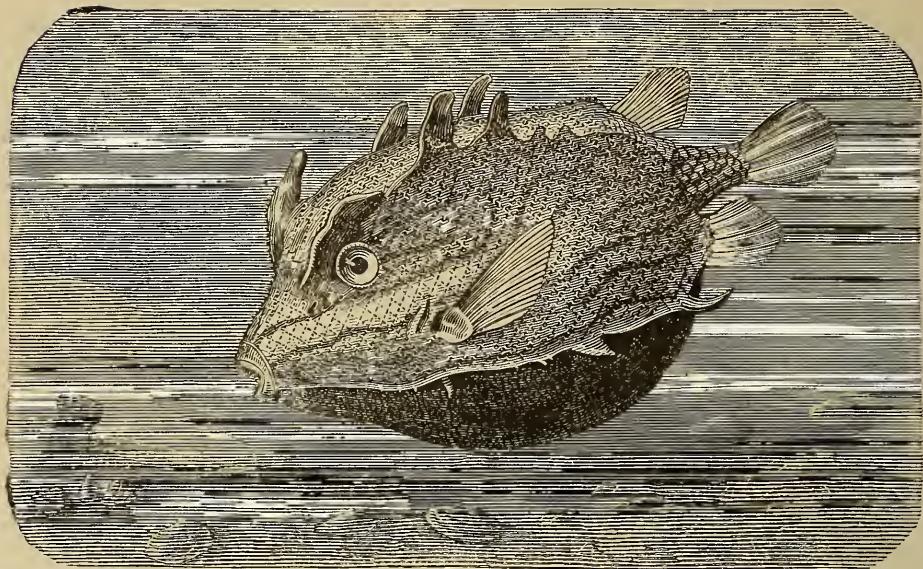


while the under parts are a rich orange color. Its usual length is fifteen or sixteen inches.

This fish has the fin on the under side of the body, made into a sort of sucker, by which he can hold on to rocks, or anything. It is said that he can hold on so well, that if put in a pail of water, he can be lifted up by the tail, when he will fasten on to the bottom and lift pail and water, and all.

The Lump Fish Mamma is reported to be more careful of her young than most fishes. She makes some sort of a home, and takes care of them till they are big enough to go out in the world, when they attach themselves to her body, and she swims off with them. That's the story, anyway.

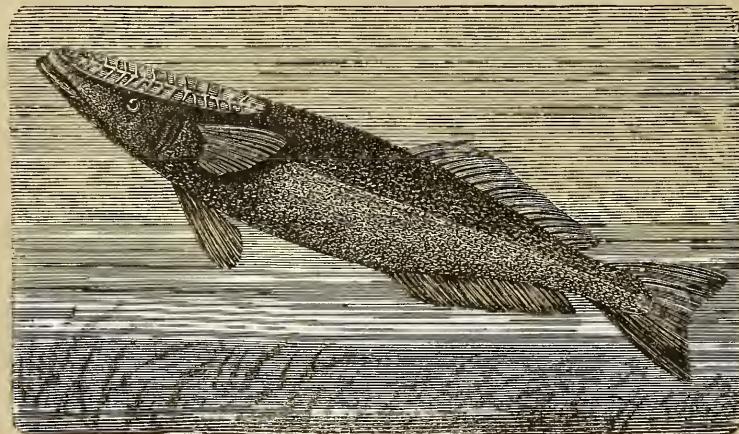
There's a curious fellow on next page dressed in mail, or rather in a box with holes for his fins and tail to come through. His coat



is not of scales like other fish, but of hard plates. In some Trunk Fishes the box or trunk is triangular, and in others it is square.

He lives in the Tropical seas, and nobody wants to eat him. So I suspect he has a very good time.

See this flat headed fellow; he isn't very pretty to be sure, but he is very strange. The flat part of his head is a sucking disk, by



which he can attach himself to anything—a large fish, a vessel, or anything else—so tightly that it cannot be pulled off without tearing

it. He is fond of using this power, and he has been found attached to turtles, whales, and other large fish, the shark being the favorite one.

It is about eight inches long, and no one knows exactly why it prefers to be towed along by some other fish, rather than swim for itself. It is supposed to be for the sake of the protection of the large fish. Six or seven of these little fellows will sometimes be found on a shark.

It is always hungry, and will take any bait; but the fisherman whose hook he has swallowed, is not yet sure of him. The minute he feels himself caught, he will rush for the bottom of the ship or some other firm hold, and then he will hold on till the hook is torn out of his mouth.

Of course you have all heard of the Sword Fish, and here he is. He lives in the Mediterranean, and also in the Atlantic ocean, and he is caught with a harpoon.



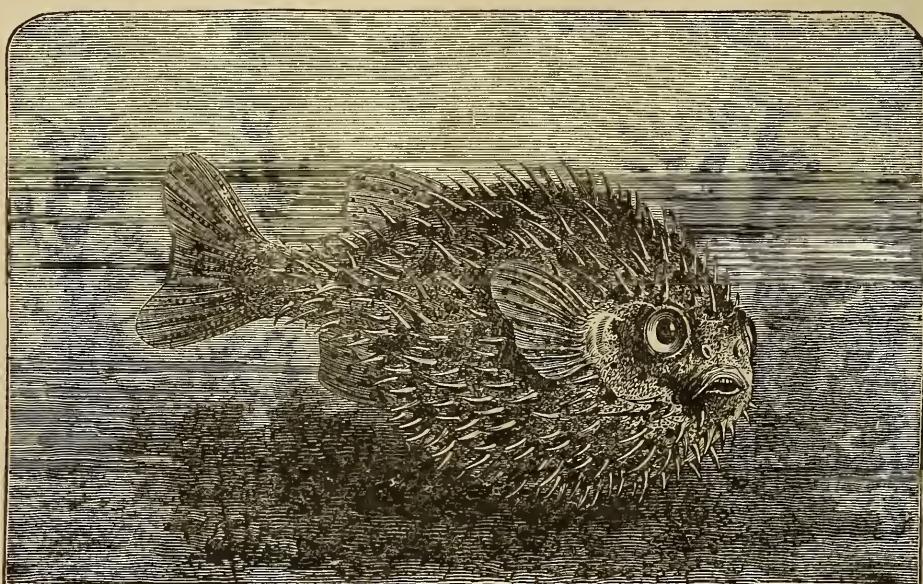
Just what the sword is used for is not known. It has been found run into a whale, and also into the bottom of ships.

The Sword Fishes usually go in pairs, and live on cuttle fish, and some small fishes which it does not need to kill with the sword.

Its color is blue-black above, and white below, and it is usually ten or twelve feet long, sometimes much longer.

This fish sometimes has serious fights with the saw fish. It is not good to eat.

The fishermen of the Mediterranean who fish for this creature, have a curious superstition about it. While out seeking them, the men chant a song set to Greek words, and believe that the fish will follow as long as they sing that. They say, however, that one word of Italian will drive them back to the bottom of the sea.



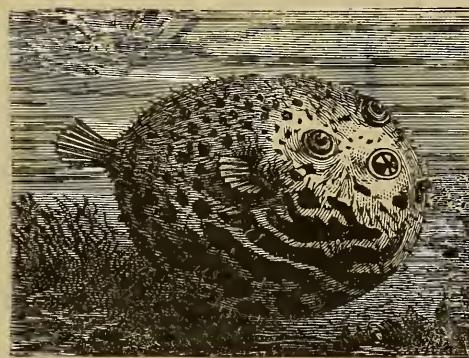
Here's a beauty! What a delightful object he would be to encounter.

He is called *Diodon*, because he has but two teeth, or rather his lower jaws are not divided, so that the upper part is one tooth, and the lower another.

This creature is dressed in spiny points—as you see—and can inflate himself into the shape of a ball, making his spines stick out in every direction. He has also the name of Prickly Globe Fish. He's a spunky fellow; after being some time out of water, he will puff himself up, stick up his spines, gnash his teeth, and make some sort of a sound.

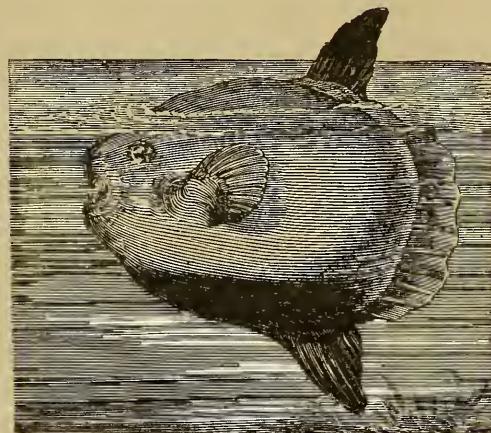
A full grown *Diodon*, or Sea Hedgehog, will measure more than a foot in diameter.

The Globe or Balloon Fish belongs to the same family, you see. What an intelligent face he has! Look at that mouth! This creature can puff himself up with air till he looks like a balloon.



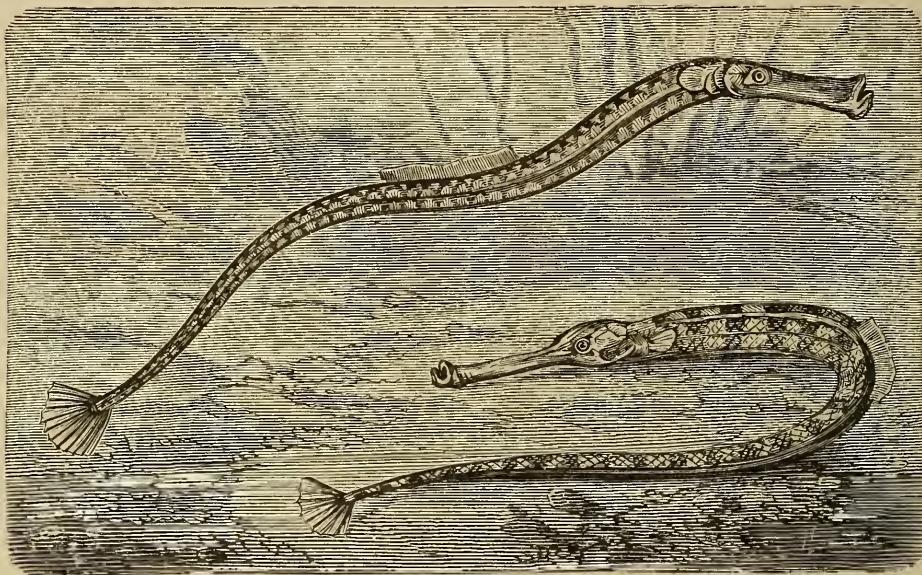
Below is a fish which Mr. Wood says looks as if the head and shoulders of some very large fish had been cut off, and a fin put on to the cut end. It gets the name of Sun Fish from its shining silvery white sides, and partly also from its shape.

In the night it is brilliantly bright, and can be seen swimming about in its own light. It is five or six feet long, which you would not suspect from the size of the picture.



It usually swims with the back fin above the water. Its flesh is white and good to eat.

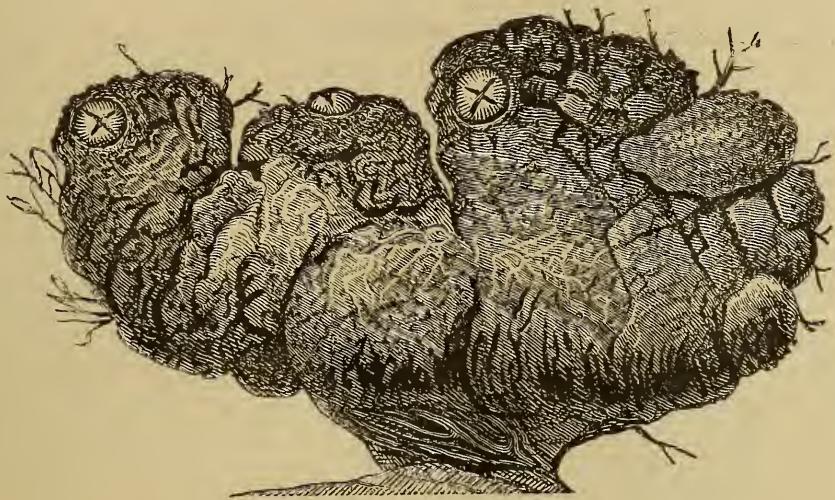
After all these great round fellows, I think a slim fish will make a pleasant variety, and here's the slimmest I can find—the Pipe Fish, or Needle Fish, as he is sometimes called.



He is a droll fellow, and performs some curious antics. Sometimes he will rush through the water like a race horse, examining every crack and cranny he comes to, and then he will amuse himself by standing on his head awhile, blowing holes in the sand on the bottom. He is usually about eighteen inches long, but he has smaller relatives.

There is the Snake Pipe Fish, about fourteen inches long and the size of a goose-quill, and the Worm Pipe Fish which I believe is the smallest kind. This one has very amusing ways in an aquarium. Its eyes are beautiful, and move independently of each other, like the chameleon and the sea horse. It has also a prehensile tail; that is, it curls around a weed and holds on while its body waves back and forth. When it gets tired, it hides under the weeds.

Some of the Pipe Fishes have a pocket in the skin in which to bring up their babies, as I told you the sea horse has.



A LIVE BAG.

Dear me, who would ever think this curious looking object was alive, and could eat, and was in fact an animal! It has no head, no arms, no legs, but it has a stomach (in truth it is nearly all stomach), a mouth, nerves, a heart, and very small eyes. They are called *Tunicates*, because they have no shell, but a sort of elastic tunic. Some of them are transparent, and really beautiful; but others are scarcely more than a shapeless mass.

The one in the picture is one of the Simple or Solitary *Tunicates*; called so because it attaches itself to a rock, each individual for himself, and never moves from that spot. There he sits the whole of his life, drawing in the sea water at one of those curious openings you see on him, and pouring it out at the other, after taking from it all that he wants to eat. Thus he keeps up a constant current of water, and so the bag is always full. This creature, too, is usually covered with a growth of sea weeds, and half covered with sand and stones, so that he can't be said to be very interesting to look at. But some of his family are gaily colored with orange, crimson and white, and attain to quite a large size (for *Tunicates*) being five or six inches long.

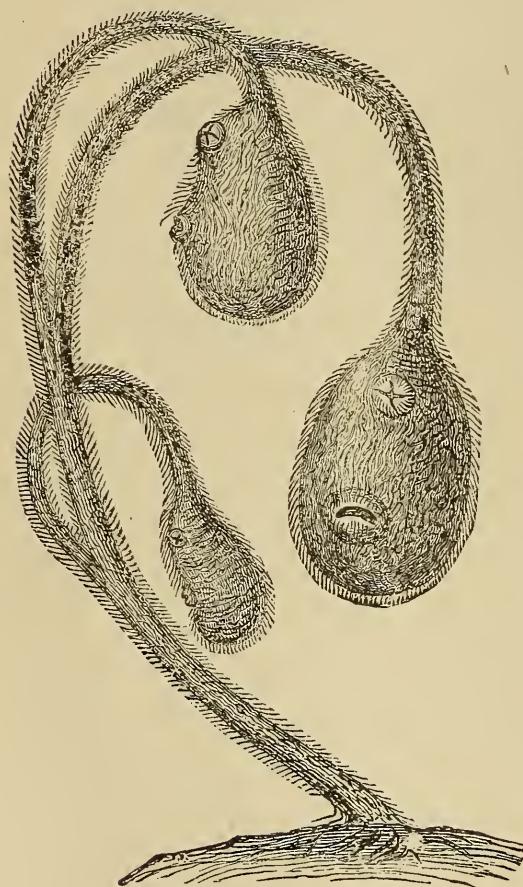
These creatures do not care for deep water, and are often found clinging to the under side of stones just in the edge of the sea. When the stone is turned over, the curious little animal looks like a shapeless mass of jelly. Some of them are not as large as a pin's head, but transparent as glass. Others look like masses of ice. The eyes are minute specks around the two openings into this very strange bag.

The *Tunicates* are divided into Solitary, Social and Compound *Tunicates*. Here is a picture of one of the Social *Tunicates*, where

several of a family, though entirely separate from each other, are attached to the same stalk. This looks even less like an animal than the other. It resembles some strange plant, but you see each individual has the bag-like body, and the two openings into it.

Of the Compound *Tunicates* there are several very interesting varieties—one called Starry, because of the star shape into which the family forms itself. From six to twenty of these creatures will be found united in a common center, so as to form a star, each with his own organs, and living on his own account. If you touch one bag, one animal will contract itself; but if you touch the center, all will contract. The mouths are on the outside, or circumference of the star. This compound animal is fixed in one place.

But another branch of the family called *Pyrosena*, (which means "Fire Body") because of the beautiful light they give out, floats about, and is one of the most beautiful objects to be seen in the wonderful sea. The light is so strong that when floating in



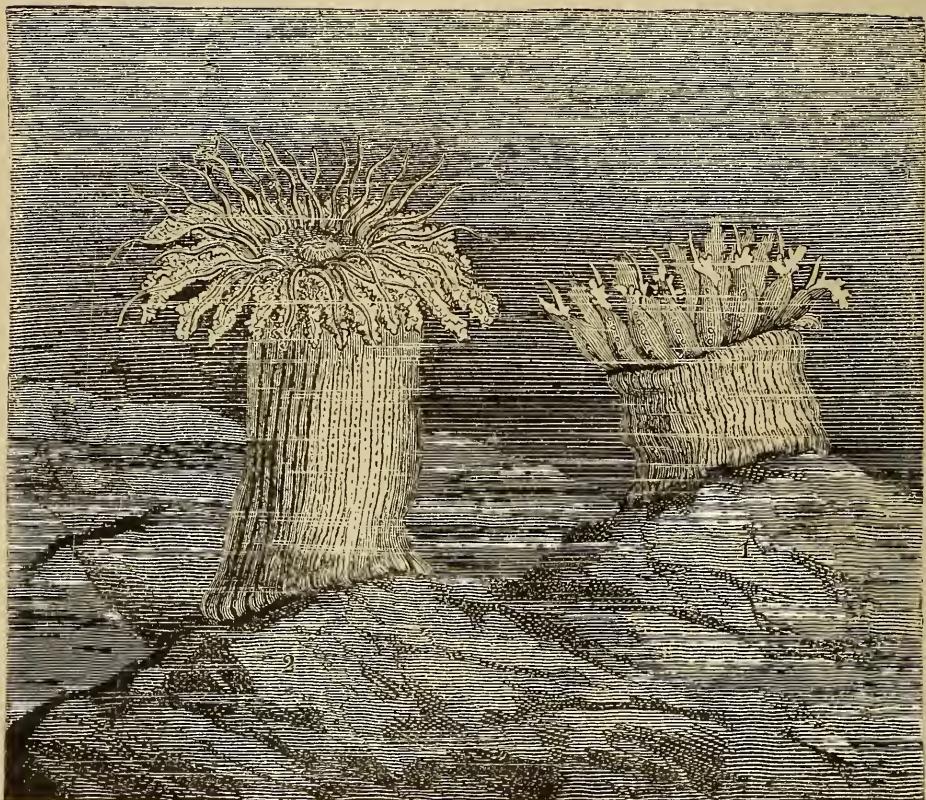
the water, fishes at the depth of eighteen feet could be readily seen by it, and half a dozen of the individuals which make up the floating colony, will light up a ship's cabin enough to enable one to read. The light is of a greenish hue. The *Pyrosena* is shaped like a long cylinder, and it moves through the water by the force of the water thrown out all the time, for though they are floating about, they eat all the time like the rest of the family.

Another of the Tunicates is the *Salpa*. In this, the individuals are united in long chains, which glide through the water with a peculiar motion like a serpent. Sailors often call them sea snakes. They move by the same means as the *Pyrosena*, the current of water which each one of the chain throws out. They work together like a machine, each drawing in and throwing out at the same moment with all the rest.

When a chain of *Salpas* is broken, each one can live by itself, and any attempt to get them out of the water separates them at once.

There's another curious thing about this family. The young of these chain *Salpas* are always solitary, and their young are the chained family again.

*Salpas* are found in the Mediterranean sea, and in the Equatorial seas. They live some ways below the surface usually, but on calm nights they come to the surface.



### SEA FLOWERS.

You would hardly go to the sea for flowers, but there is a family of *Zoophytes* which so much resemble our land flowers, that they are called Sea Anemones—rather an absurd name, by the way, for they do not look half so much like Anemones as they do like daisies or dandelions. You see one kind in the picture. On the left, you see it fully expanded, showing its lovely petal-like arms, and on the right, as it looks when half shut up. These flowers can shut up when they like, and they will do so very quickly if you come near them.

Besides being able to shut up, these wonderful flowers can get about some. They are not—to be sure—great travelers, much preferring to fasten on to some rock or shell and stay there, but they can, if they wish, move to some other place. The short thick stem of the flower is the body of the animal, and in it are the necessary organs, stomach and so forth, which all animals must have. The beautiful flower-like petals around the top, are the arms of the creature, and hidden among them is the mouth—a large and very greedy organ.

The beauty of the animal is in its arms—or tentacles, as the books call them—and they are of all imaginable colors, of the most delicate shades, and graceful shapes. But elegant and dainty as they look when waving carelessly about in the water, they are very useful to the little animal. They catch and stuff into the mouth, the food for which they are so greedy.

The stomach of the Sea Anemone is a curious organ, too. It receives the food which the arms put into the mouth, digest what is suited to it, and throws the rest back out of the mouth again. For instance, one of these creatures will seize and devour a small fish, but its bones cannot be digested, so when the meat is all gone, the bones are sent out into the sea. But I think the most singular use of the stomach is to send out the babies into the world. When they are ready, they pass from some other place into the stomach, and out they shoot into the water, to take care of themselves.

But these strange beings have another way of increasing the family, and that is by budding. A sort of a bud will grow out one side, and when full grown it will break off from the parent and set up in life for itself.

The Sea Anemone has wonderful power of reproducing any part that is torn off; it may be cut in pieces, and every piece will reproduce what is lacking and at last become a perfect animal.

I told you they could change their home. Sometimes they move along on the base—just as they stand in the water—but very slowly, perhaps half an inch in five minutes; but sometimes they turn over and walk on their head—you may say—using their arms for feet; and sometimes they move by filling the body with water, thus making it more buoyant, letting go their hold of the rock, and letting the waves drift them along.

Sea Anemones eat shrimps, small crabs, and many small sea

creatures, which it catches in its useful arms, and holds very tight. It isn't particular about its prey being small, either; choking is a sensation unknown to one of this family. One naturalist tells a story of finding a Sea Anemone which was originally two inches in diameter, and which had swallowed a shell the size of a saucer. One would think that would be sure death, but the cool little fellow was not at all disconcerted. Finding his stomach divided in two, he proceeded at once to grow another set of arms to feed his extra stomach. So he had actually become a double Anemone.

But fond as they are of eating, they don't have things all their own way. Sometimes their food, (which of course they swallow alive) is too lively for them, and wriggles its way out of the stomach. Again some saucy little robber of the sea will snatch the tempting morsel away, and sometimes an impudent little shrimp will deliberately seat himself on the beautiful flower, and sticking his claws into the Anemone's mouth, drag the coveted mouthful out and eat it himself. But the Anemone will fight, and sometimes the shrimp overrates his own strength, and instead of getting the morsel out, he goes in himself and is devoured.

All these things have been seen in aquaria, where Sea Anemones are favorite objects, because of their great beauty. When it is quiet and light, they will expand their lovely arms, and are really wonderful to see; but if any one comes near, or the water is disturbed, they will shut up in an instant.

I want to tell you about a discovery made by Mr. Gosse with his microscope. He found that the innocent looking arms of Sea Anemones, were provided with a tremendous array of weapons. The whole surface of the arm was seen—under the glass—to be covered with tiny sort of cells, in each of which was coiled a fine thread. These threads can be shot out by the creature, and they are not threads either, but long wiry darts of beautiful structure, and able to pierce any soft substance. Even a human finger when pierced by these sharp weapons feels the effect of it in the shape of small blisters, and you can imagine how much more severe they must be on the delicate bodies of the tiny creatures in the sea.

One family of Sea Anemones is called Pufflet, because they can puff out their column till it looks like a ball.

Another kind is called Snake-Locked-Anemone, because its arms really look something like a crowd of snakes writhing about in the water.

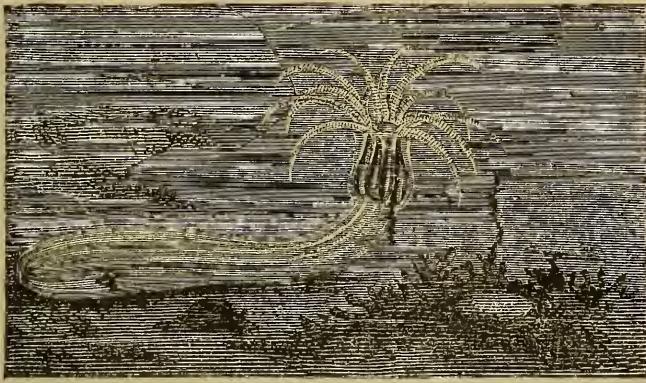
Another is called the Beadlet, because it has what looks like a circle of beads at the base of its arms. These beads are rich blue, looking like turquoises, while the arms are of all bright colors. This little fellow is a very pretty object for the aquarium. He has a fashion of crawling up the glass till he reaches the surface of the water, when he will turn himself over with his arms down, make his base hollow like a sort of a boat, and float off on the top.

Not all Sea Anemones have the base attached to something.

Here is a picture of one of the free ones. It has rather a worm-like body you see.

These creatures are said to be good to eat.

On the next page is another odd little fellow who builds—or rather burrows—his own house. Nature provides him with a

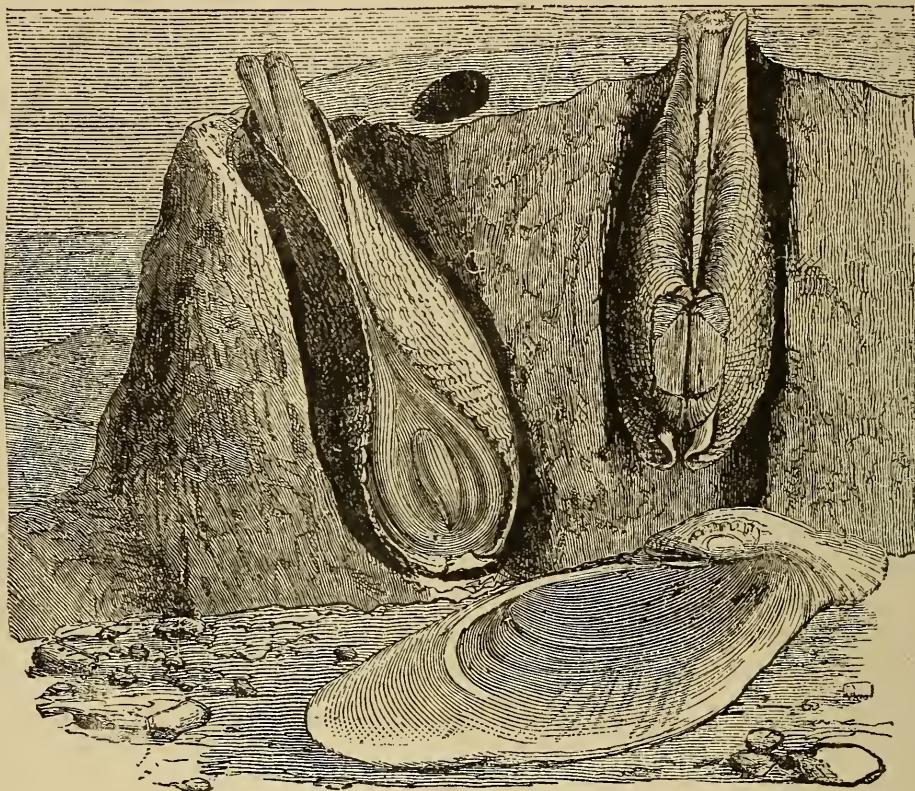


shell, and one would suppose that house enough for one unassuming little sea creature. But the shell is very delicate, and would easily crush between the horny jaws of his enemies, so he just makes himself a safe retreat in a rock.

You see two of the family in the picture. One is turned so as to show you the hinge of the two shells he wears, while the other shows you the animal himself as he usually lies, and displays his curious little white foot. Of course, in life the front of the rock is solid and nothing can be seen but that part of his body which he thrusts out of the house. The empty hole which you see between the two, shows how the house looks when seen on the rocks.

This curious little digger is called the *Pholas*, or to give you his whole name, as it is in the wise books—the *Pholas Dactylus*. He has been known for a long time, but his observers could not readily agree about how his house was made. Some thought he bored it out by means of his little feet; others contended that the creature secreted a sort of acid which made the rock soft and easy to scrape out. And still others would have him gifted with a galvanic battery with which to make himself a home. But all these

ingenious theories come to nothing when some one watches him at work and finally sees him boring out his house with the sharp file-like edges of his shell. He uses his shell as you would use a brad



awl, turning it half around one way, and then half around the other way. Naturalists have proved that it could be done, by taking the empty shell in their hands and boring a hole thus, but one gentleman who kept them in confinement, and watched them at work, has actually seen them do it. There's another thing that proves this to be true, and that is the fact that when the rock is soft and easily worked, the animal—having an easy time making his home—grows the largest, and most perfect, while those unfortunates who having hard gritty rocks to bore into, wear their shells off smooth and are small in size, dwarfed by overwork. As soon as the *Pholas* has completely buried himself his work is done, and from that time he lives in peace, sticking the tube-like part of his

curious body out of his door, and getting his food from the sea water which washes over him. And he not only lives in peace, but here he dies, and the house he has made for himself with so much trouble is also his grave.

As you can see in the picture, the *Pholas* has a very curiously shaped body. It is much like a club with the small end up, and is of a white fleshy substance. In the end that sticks up, you can see two holes, and by means of which the *Pholas* breathes. He breathes air, but he has to get it out of the sea water, and this is the way he does it. He draws the water in to one of the holes, and after breathing the air which is in it, he throws it out at the other.

But the sea water, you know, is full of little atoms which might hurt the delicate organs inside this droll little body, and to prevent such a catastrophe there is a wonderful and beautiful arrangement by which everything hurtful is strained out of the water. This is done by a quantity of delicate thread-like filaments, which line the tube through which the water comes and which spread out in the shape of tiny trees. These delicate threads meet in the center, and form a complete strainer.

Another singular thing about this little borer is the fact that he can give out light in the dark. I have told you of other sea creatures which had that peculiarity, but one would hardly expect to find it in a modest little fellow who never goes away from home.

The *Pholas* is eaten by many people, and is said to be very nice. His foot—which looks as if cut from clear ice—is often used for bait by fishermen.

Small and insignificant as the *Pholas Dactylus* seems to us, it is thought by naturalists to be a very important agent in making the changes that are perpetually going on in our sea coasts. He and his brother borers gradually undermine the rocks and the constant wash of the waves does the rest, till some day a great mass of rock falls into the sea. Then the industrious little fellows attack a new place in the rock, and so it goes on year after year.

While I am telling you about borers, I must not forget another of the family—*Teredo*, or Ship Worm. This creature, who prefers to make his home in wood, is a great nuisance to ship owners, and every one who has an interest in any wood which is constantly covered with water. He bores long tunnels into the wood, and so weakens it that the thickest piles are broken off like pipe stems by

the waves. He is so common that no wood is safe from him, and ships have to be protected by metal covering, and piles by nails driven into them so that he cannot drive his tunnels.

He is a curious looking fellow, more like a worm than a mollusk—which he is. He is about a half an inch thick, and a foot long. At one end of his body is a pair of curved shell valves, and at the other, a forked part, containing the siphon or breathing tubes, such as I described in the *Pholas*. His color is very light gray.

As he bores out his curious home in the wood, the *Teredo* lines it with a thin shell, and the burrows are sometimes so near together that it is not thicker than a sheet of paper between them. Many a bridge has fallen because its timbers were destroyed by this dreadful little creature, and many a ship has gone down with all its crew because of the same industrious *Teredo*. Holland was at one time threatened with total destruction by a sudden attack of *Teredos* on the piles which support the dikes that keep the sea from that curious country.

But he was not always a contented prisoner in his own house. When the *Teredo* was first hatched from a round greenish colored egg, he looked more like a tiny hedgehog than anything else, being covered with little hairs or spines. These hairs, by their constant motion, helped the little creature to get about in the water, and very lively he was for about a day and a half. Then his first change takes place, his skin bursts open and becomes a shell, and he has a new set of swimming organs in the shape of a sort of collar of the movable hairs, which acts something like the paddle wheel of a steamer.

But now—as he grows older—the curious creature begins to long for the quiet which he finds in his wooden home, and a new organ shows itself, namely, a sort of foot, by which to hold on to one spot. This foot can be lengthened or shortened, and indeed looks more like a tongue. At this stage of his life he can hear and see also. But his last change approaches ; he seeks a piece of wood along which he creeps till he finds a point which exactly suits him. There he stops, fastens himself there, and begins to bore out his future house. How he does it is not yet known. It is not by working himself around as the *Pholas* bores, for he can't do that, but whether by the aid of a fluid which he secretes or by working his head against the wood already softened by the sea water, is not

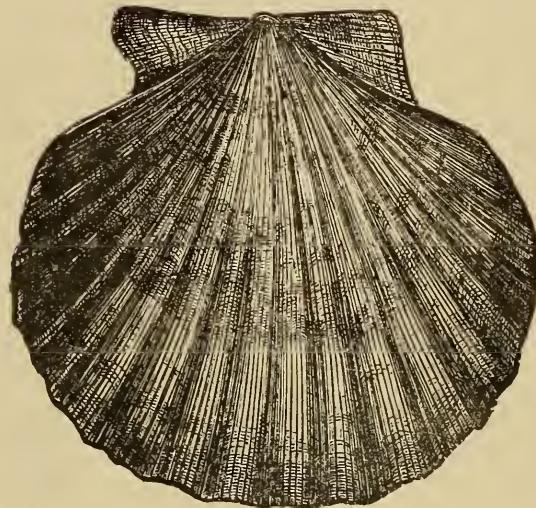
positively known. All we are sure of is that he *does* make a long tunnel, and as he goes on, he lines it with a sort of shell, in which he lives. Meantime, he is growing longer and longer, and having no more use for ears and eyes, he loses them, and at last comes to be the long slim fellow I described to you, spending all his life in a hole just big enough for him, eating and breathing, and no doubt just as happy in his way, as beings of a higher organization.

The common Ship Worm has a relative called the Giant *Teredo*, who sometimes grows to the length of six feet, and the diameter of three inches. Happily, this great creature don't like wood for his house, but bores into the hard mud of the bottom of the sea. This fellow's shell is half an inch thick, of a white color, and very hard. He is found in Sumatra, and was first discovered on the occasion of an earthquake which threw up great masses of earth from the bottom of the sea. In this dried mud was found the Giant *Teredo* calmly reposing in his monstrous tunnel.

There is still another of this boring family, who prefers for a residence the wood of cocoa-nuts, and other hard shelled fruits growing in the Tropics. Of course he is unable to make a straight tunnel in such a small space, so he winds about and his long scientific name means horn-shaped.

The *Teredo* has the honor of having suggested to English engineers the plan of tunnel building which was first applied to the construction of the Thames tunnel.

## BUTTERFLIES OF THE SEA.



Of course they are no more real butterflies than the sea anemones are real flowers; but they have received the name from their beautiful colors, and their lively, jerky way of getting about. This picture is the shell in which one of these beauties spent his life, and you probably will call it a scallop shell. There are nearly two hundred varieties of the family, and they are found in every sea in the world, and called by the family name of *Pecten*.

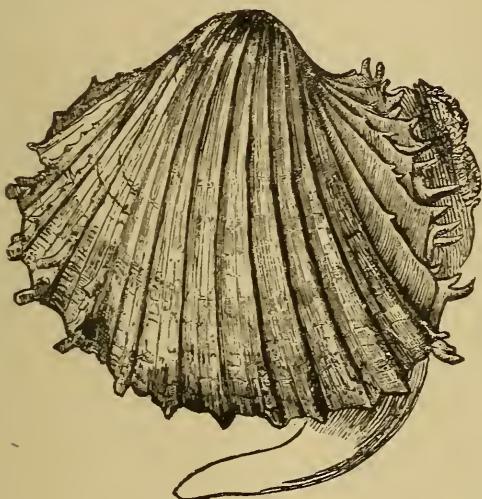
The creature who lived in this shell has one small foot, a body which looks like a sort of a folded-up veil, just showing between the edges of the shells—for he has two, you must know—a double row of eyes looking out from the same opening, and a white fringe of tentacles or feelers. He moves about in the water by opening and shutting his beautiful shells, throwing out the water violently, and of course pushing himself along. He has also a strong muscle by which to hold his door shut in the face of enemies. The triangular shaped part of the shell is called the ear, and here are placed the hinges which allow the shell to open. Among the folds of the mantle—as his body is called—the *Pecten* had a mouth, with lips, and he lived by eating the tiny animals always floating about in the sea water.

There are many varieties of the family—as I told you—and all are celebrated for their beauty of form and coloring.

Another curious little sea creature, shaped much like the *Pecten* family, is the Lima. It is a great beauty, being of a lovely crimson color, with mantle of orange, while the shell is pure white.

It has a very heavy, long sort of a fringe all around the shell, of an orange color. This fringe is composed of tentacles, and is constantly in motion, twisting and waving about in the water. This lovely little creature has a curious fashion of making itself a sort of nest, by fastening together shells, bits of coral, sands, and other materials, by a silk thread, which it can spin with its delicate little foot.

Coral is the favorite material for the nest, and when done the droll little home looks like a rough heap of broken coral. But though rough outside, it is beautifully lined with silk hangings, and the delicate little beauty lives as comfortably as any one. Taken out of his nest, and put into a dish of sea water, the Lima will swim about in a very lively way. He swims like the *Pecten*, by opening and closing his shells, thus making a jerky sort of progress through the water.



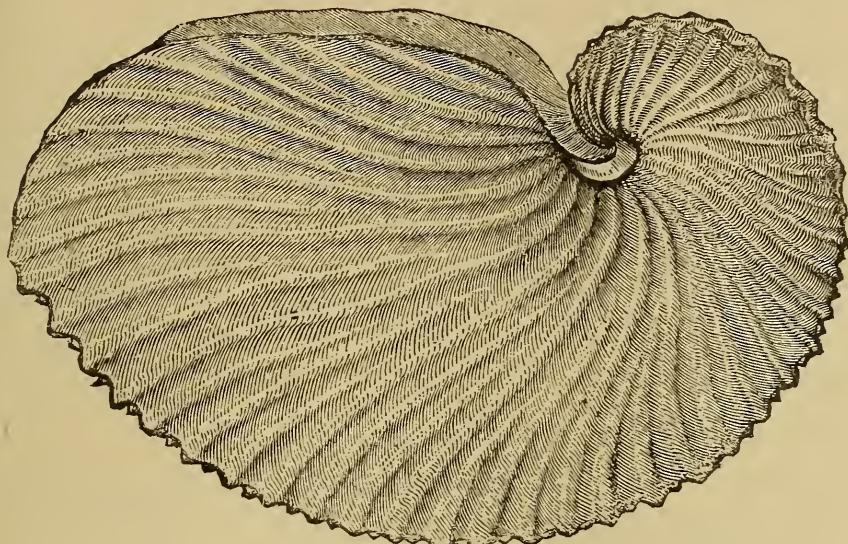
Here's another curious little fellow, who lives in two shells. He belongs to the Cockle family. You see in this picture the little fellow who lives there is at home, and his curious foot is stuck out. He has but one foot, but that is as many as he wants. I don't suppose he would know what to do with two. He lives in the sand and mud, just under the water on the sea-shore, and that odd little foot is a very useful organ. By means of it he buries himself in the sand. First, he thrusts the foot as far as he can

into the sand, and then, contracting it into a kind of a hook, the whole animal is drawn a little way into the earth. Another jerk, and he goes farther in, and so he goes on till he is entirely buried, with the exception of a tube, which he keeps out to breathe through.

But that is not the only use of the foot. He can leap with it, and has been known to jump out of a boat after he was caught. To do this he bends his foot into a hook, presses it firmly against the board or ground, and straightening it out with a jerk, away he goes like a shot.

Cockles are much sought after to eat, and the fishermen can always find them, no matter how cunningly they are hidden under the sand, by the tiny fountains made by the water, which they spurt out through their tubes.

There are two hundred kinds of Cockles known, and all of them are much admired for their beauty.



### THE PAPER NAUTILUS.

Who would suspect, to look at this pretty shaped shell, that the creature who made it, and spent its life in it, was a member of the cuttle fish family, and own cousin to the horrid *Octopus* that I have already told you about!

I don't suppose there ever lived another creature, of whom so many different stories have been told—and believed—as the Nautilus. The ancients have romanced about it, and poets have written about it, till we hardly know what to believe. It was called the Argonaut, in memory of the ship Argo, about which there is an old fable which you must find out for yourselves in some Classical Dictionary, or Encyclopedia.

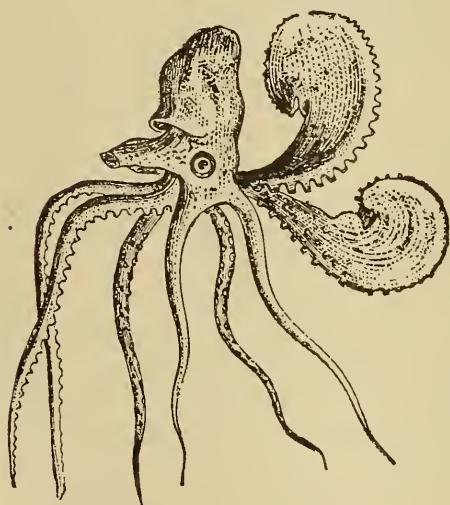
It received the name of Paper Nautilus because of its shell, which is not much thicker than paper. It was said to sail the ocean by means of two sails, assisted by its arms used as oars, and rudder. It was regarded as a good omen to meet the pretty little navigator, and a sign of good weather.

But modern scientific men have had their eyes on the Nautilus for some time, and though they have proved all these old stories to

be fables, they have told us facts quite as wonderful, and the curious little fellow has lost none of its interest for us.

To begin with, its shell is as frail as an egg shell, and will crush in the hand, and so white and transparent that one can see through it. While the animal is alive it is somewhat elastic—like thin horn, but after the death of the owner, it becomes brittle. The Nautilus not being anywhere attached to its shell, and not being shaped at all like it—as most shelled creatures are—the ancients thought the animal they always found in that shell, was a robber, who had stolen the residence of some other creature. But it has been found out that that story is a slander; the little fellow not only has a perfect right to its house, but builds the whole thing itself, enlarging it as it grows, and if a piece is broken out, the owner can put in a new piece just as perfect as the first.

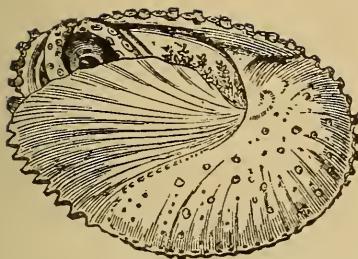
This is done by means of the singular arms which the ancients called sails. Here is a picture of the creature, as it looks when out of the beautiful shell.



You see it has eight arms—like the rest of the cuttle fishes, two of which are expanded in a curious way at the ends while the rest are covered with suckers. The two broad arms are what used to be considered as sails, but are now known to be the working tools of the Nautilus. By close watching, it has been discovered that these arms secrete the material for the shell, and mold it into shape, besides serving to hold on when it wants to swim about. In the next picture, where the Nautilus is shown drawn into its shell, you can see the broad arm more than half covering the shell on the outside.

You will notice that the body of this little creature is not very graceful in shape, but I can assure you that if not elegant in shape, it is in color. It is of a silvery color, with spots of beautiful rose color, and it has the curious power of changing its color—blushing, as it seems, when agitated in any way. These changes can be seen through the lovely transparent shell.

The six awkward long arms which hang down so ungracefully



see sticking out one side of the body, is called the siphon, and is used in breathing.

In the last picture, where you see the Nautilus drawn into its house, you will notice that it takes good care to leave enough of its bright eye out to see what is going on. If sufficiently alarmed, it can draw it completely in, nearly out of sight. You will also

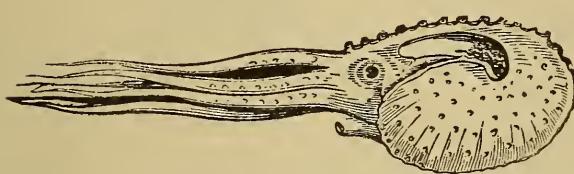
see sticking up what looks something like a cluster of grapes. Those are the eggs, for strange as it may seem, only Mamma Nautilus is the possessor of a shell,

which is also a cradle for the babies. Papa Nautilus is quite an insignificant person, not nearly so large as his wife, and too lazy (I suppose) to build himself a house. At any rate he has none. The eggs are hatched here in the beautiful shell, and from here the little ones start out in life for themselves.

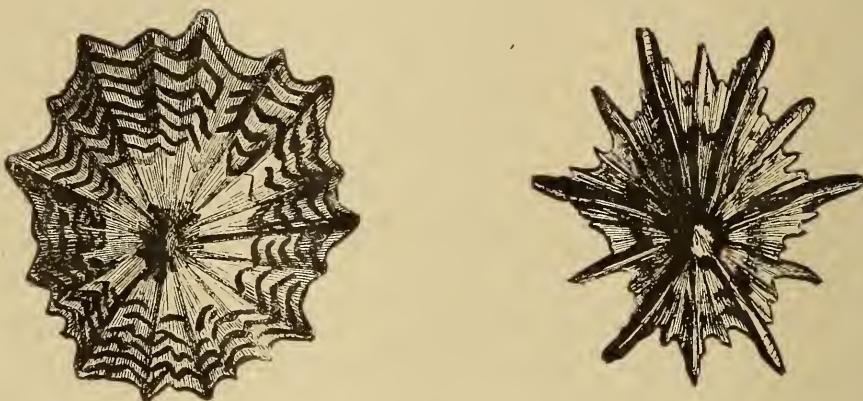
When the Nautilus wishes to swim, or dart about in the water, which is all the swimming it does, it gathers its six arms into a straight line, spreads the other two tightly over the shell, and then violently expels the water from its siphon, which sends it with a jerk through the water, shell first, as you see in this picture.

You can see the end of the tube or siphon under the eye.

The Nautilus is a timid creature, and is never seen near the shore, and sometimes when caught will leave its beautiful house and escape into the sea. Just at dusk, or in the night, is the time to see the beautiful creature sporting on the water. They are usually seen in crowds together, and only when the sea is calm.



## THE DEEP DISH.



Curious name for a family of living creatures, isn't it? They received the name because of their shells, which are shaped a good deal like a dish; though when the owner of the deep dish is inside, it looks more like a roof. At any rate, he uses it as a roof, and lives under it. The common name of these creatures is Limpet, and there are a great many kinds.

The shell of the Limpet is generally of an oval shape, and higher in the middle, but every different kind has its own peculiarity. Those at the head of this article are the Ruby-eyed Limpet, found in the Antilles, and the Long-spined Limpet. The common Limpet is found everywhere on the sea-shore, living on the rocks that are covered by the tide. It is of a gray color outside, and yellow on the inside. The shell is thick and solid. But those of the family who live near the equator are much richer in color, larger in size, and have greater variety of shapes. One kind is as large as a good-sized dish, and it is used by the people of the Straits of Magellan for kitchen purposes. Even one of the common Limpets sometimes grows as large as a foot in diameter.

But the shell is not the only curious part of the Limpet; the tongue is a very singular organ. In the common sort the tongue is three inches long, and a twelfth of an inch wide, and looks

more like a worm than anything else. It is covered, for its whole length, with three rows of teeth, pointing backward. These teeth are cut into points on the edge, and are for the purpose of cutting up the food. The strangest thing about it is, that it is never thrust out beyond the lips, and as fast as the teeth on one part get worn down, another part comes forward to take their place.

When the Limpet wants to eat, it sticks out the lips, and forms the tongue into the shape of a spoon. The lips then seize the food—which is vegetable matter—and with the help of the tongue, draw it in and cut it off against the hard upper jaw, sometimes making a noise in the operation. The morsel is then passed on another tongue, and torn and cut up by the sharp teeth.

The body of the Limpet is oval, shaped like the shell, with a short, stout proboscis, and a pair of feelers, at the bottom of which are a pair of eyes. He also has what is called a foot, a fleshy object, which helps him to get around. He don't care, however, about getting about much, for he belongs to a very dignified, slow-moving family.

He makes for himself a curious home in the solid rock. It is simply a hole, perhaps an eighth of an inch deep, and just the shape of his shell. How he makes the hole is not yet positively known. In this hole the odd little fellow spends most of his time; sometimes with his shell a little raised, and so careless, that if suddenly attacked, he can be easily knocked out. But let him first be warned, and scarcely any human power can pull him out. Holding on is his way of protecting himself, and he does it in a very effectual way. Sea birds are very fond of eating the Limpet, and they are wise enough to catch him by pouncing suddenly upon him, and driving their beak between him and the rock, before he has time to be alarmed.

How he manages to fasten himself so securely is still a question. Some writers say that it is by suction, as you boys fasten a piece of wet leather to a stone; while others say that if the Limpet is cut in two, down through the shell, each half will hold on as well as the whole. Of course, then, it could not be by suction, and therefore another theory had to be formed. This is said to be by a very strong glue, which the Limpet himself produces, and by which he can instantly fasten himself. This is apparently proved by the fact that the rock is found to be sticky where a Limpet has been holding, and a little water will dissolve it. The foot of the crea-

ture contains both the wonderful cement and the water to dissolve it. Whichever way be true, it is certainly very wonderful that such a little creature can fasten himself so tightly to a flat rock.

Though apparently such a home body, the Limpet does walk out now and then, in a very stately way, making a slight track in the rock with the end of his shell, and nibbling the sea-weed as he goes.

Though rather tough, the Limpet can be eaten, and to that fact it is, doubtless, due that many poor dwellers by the sea-shore have not starved to death. It can be eaten cooked or raw.

The Keyhole Limpet—which is one of the family—gets his name from a curious hole in his shell, somewhat in the shape of a keyhole, and through which he throws the sea water.

Another is cal'ed the Duck-bil Limpet, because he is of a yel'ow co'or, and shaped much like the bi'l of a duck. This creature belongs to New Zealand.

Another variety is called the Cup-and-saucer Limpet, because of a curious bony formation inside the shell, which, when the animal is out, looks something like a cup, while the whole shell answers for the saucer.

The Lady's Bonnet is the funny name of one kind of Limpet, and the Hungarian Bonnet is another.

### WHAT IS IT?

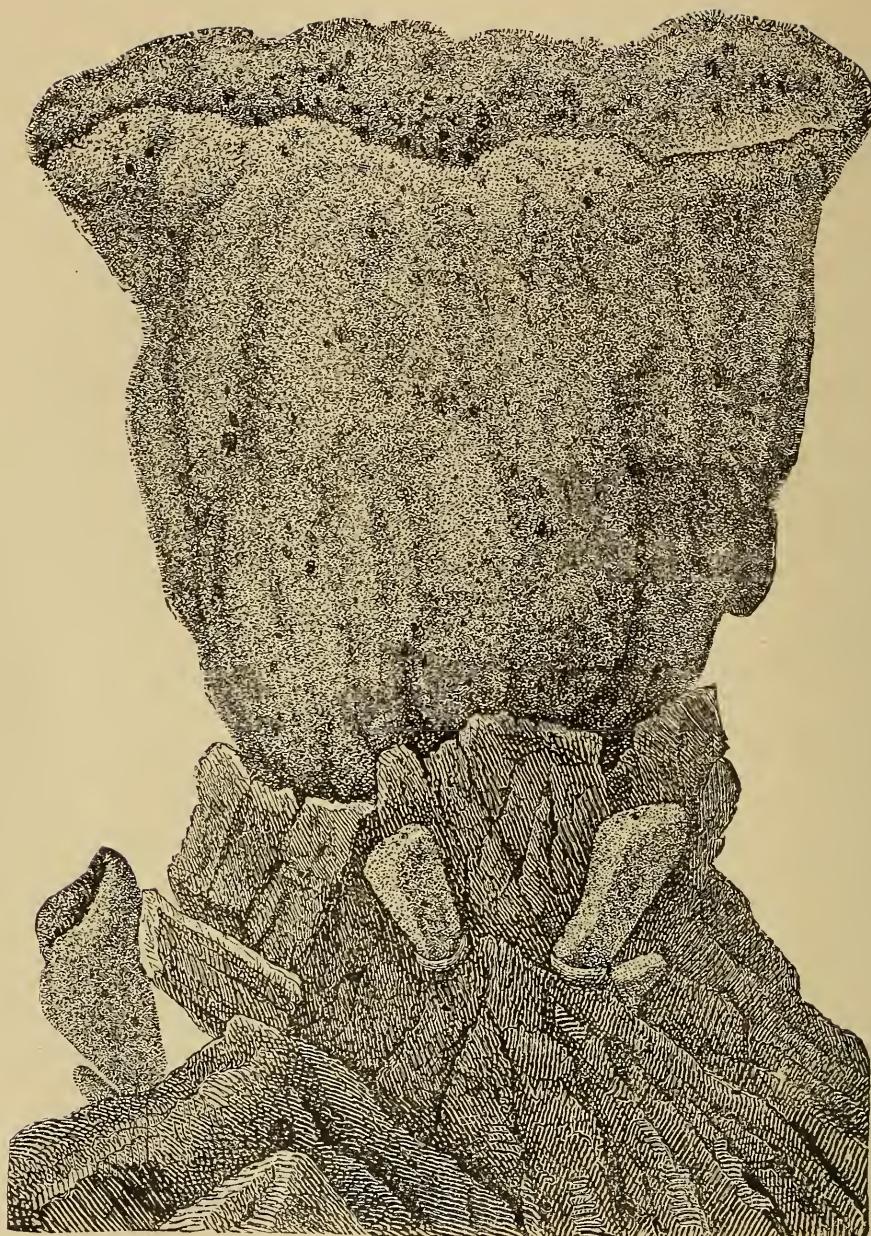
Do you think this fellow on the next page is a strange looking object to be put among "Little Folks?" Well, so it is, and the wise men are not yet agreed that it is an animal, and able to eat. But most of them have decided that it is the very lowest form of animal life, just a small step above the vegetable world.

Sponges are found of all sizes, from a tiny speck up to three or four feet high. The original of the one in the picture, is twice the size that you see it there. You have seen many Sponges, and probably you think you know just how they would look, alive, but I can assure you there is a vast difference between the living and the dead Sponge. Many of them are of delicate, pretty colors, and all of them, though unable to walk about, are really quite lively creatures.

They cannot walk about—as I said—but like the oyster, always live in one spot, holding on to the rock or shell where they first found resting place, through the whole of their life. Sometimes they fasten themselves to shells of living animals, such as crabs, and thus get carried about. The animal part of the Sponge is a soft substance, upheld by a sort of horny network which answers the purpose of bones. While alive, the curious creature does nothing but draw the sea water into its thousands of small mouths, and keeping what it wants to eat, throwing the rest out in a tiny fountain from the larger openings which you will easily find if you look at a Sponge. "A Sponge in full action," Mr. Wood says, "is a wonderful sight."

The Sponge will shrink away from the hand that tries to seize it, and it has the power of replacing any part that is torn away.

In the spring, the Sponges throw off quantities of small round eggs of a yellow or white color. From these eggs are hatched tiny atoms of life, which float about a day or two, and then settle on to the first convenient place they find and proceed to grow into Sponges like their mother.



There are many different kinds of Sponges; several hundred in all. The largest known, is called "Neptune's Cup," and is found on the shore of Singapore. It is three or four feet high, hollowed out

like a cup, and looking not so much like a Sponge as it does like a piece of rough bark. It is stiff, and not elastic like a common one of its tribe.

Another kind is called—from its shape—the “Mermaid’s Glove.” It is sometimes two feet high, and rough and thorny to the touch. It is of a pale straw color.

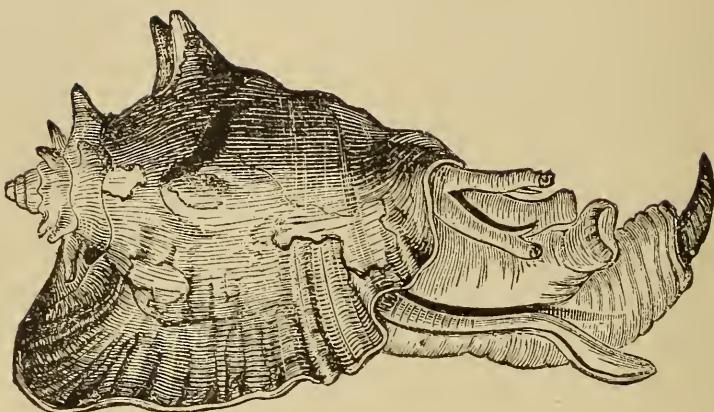
Sponge fishing is carried on in various places, and in various ways. On the coast of Syria, many boats are sent out every year. Each boat has four or five men. The poorer kind of Sponges are found in shallow water, and are reached by a three-pronged sort of a fork, which tears them off from the rocks. But the better and finer sorts are found in deep water, and for these, divers are employed. The diver takes a knife and carefully removes the Sponge without tearing it. Of course these Sponges cost more than those that are torn up.

Sponge fishing is carried on at various places in the Mediterranean sea, and so many of them are brought up every year, that people begin to suggest that they should be cultivated before the race is extinct.

The Arabs fish for them in the Red sea, by diving.

In the Gulf of Mexico, the fishermen sink a long pole into the water and drop down that, on to the Sponges.

There is a great difference in the quality of Sponges, as you can see for yourself. The finer sorts are very expensive, and are used for the toilet only, while the coarser kinds are cheaper and are used in stables, and various other places.



### A STRANGE CREATURE.

I'm sure you have seen the shell that this curious creature carries about with him. It belongs to a family called Strombs, and this one is called *Strombus Gigas*.

He has a head you see, a foot to get about on, a pair of tentacles, a pair of eyes which are large, and provided with a pupil and iris, so that they look more like our eyes than the black specks which the cowries have. It has also a trunk or proboscis, and a horny kind of an operculum, or door, with which it can partly close up its house when it desires seclusion.

The whole family of Strombs are so shy in their ways, that very little is known about them. They live in Tropical seas, and their beautiful shells—which are rose pink inside—are used to cut into cameos. This picture is of the Giant Stromb, and the shell sometimes weighs four or five pounds. In one year, three hundred thousand of these shells were brought to Liverpool.

It is also put to other uses. Sometimes it is eaten—in the Barbadoes it is a regular object to be found in the markets. In other places the shell is used for paving. The streets of Vera Cruz are said to be paved with them.

*THE LITTLE CREATURES THAT LIVE IN THE  
COWRY SHELLS.*

Isn't this a comical looking little fellow, crawling along with his house on his back? When I was a child I used to wonder what sort of an animal lived in the Cowry Shells, so long and oval in shape, and with such a very narrow opening; and I dare say you have often had the same thoughts, for Cowries are among the most common shells in collections. You have seen them given to baby to play with, put into toes of stockings to darn over, ornamented with the "Lord's Prayer" on the back, and have many a time held one to your ear "to hear the roar of the sea"—I dare say. And now here is a picture of it as it looks in the sea, when its owner and builder is at home, and taking a promenade in all his glory.



The broad part of the animal which rests on the ground, is called the foot, because with it he walks about. Happily he has but one, since it is larger than all the rest of his body. That part which is turned up, partly covering the shell, and ornamented with various little tufts, is the mantle, and it can be drawn up so as nearly or quite to cover the shell, the two sides meeting at the top. It is this useful mantle that builds the shell.

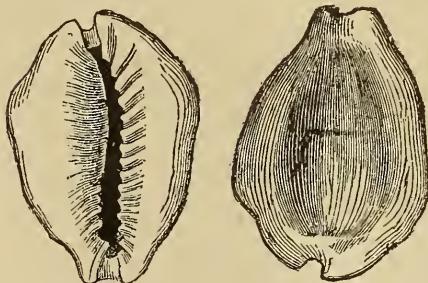
At one end, you see the two tentacles with the droll little black eyes near the base of them, and the proboscis sticking out between. Inside the proboscis are thousands of stiff hairs which by their movement keep up a constant current of sea water, by which the Cowry is able to breathe.

Now all this great body of flesh—foot, mantle, and all—comes out of a narrow slit in the shell, and what is more, it can be drawn

back, entirely out of sight, so that the shell looks much like those you have seen on shelves. There is a wonderful difference in the looks of the beautiful creature when crawling about in the water with all its bright colors exposed, and in the same fellow after it has been taken up, when everything is jerked into the house in a twinkle.

Cowries are very timid little creatures, and live in crevices in the rocks, or buried in the sand. A few kinds are found in the north, but most of the family live in the Indian ocean. They only come out for their food, which consists of small sea creatures. The one in the picture is called the Tiger Cowry, because of the marking on his shell.

But I must tell you how the shell is made. It begins before the young Cowry leaves the egg, and is made by the mantle. Certain glands in that, have the power of depositing a sort of animal matter which hardens, and then is lined by a coating of the same stuff mixed with a chalky material. Another thin layer of the animal matter is then laid on the outside, and when hard, is lined as before. So it goes on, as it grows, building larger till it has got its growth and the shell is done. But all the time, it has been getting its beautiful colors from certain glands in that wonderful mantle, and at last it has only to receive its coat of enamel, a hard glassy surface which protects it. Sometimes some other shell will become attached to the Cowry before the enamel is put on ; in which case, the intruding shell is also covered with enamel, and held there for life.



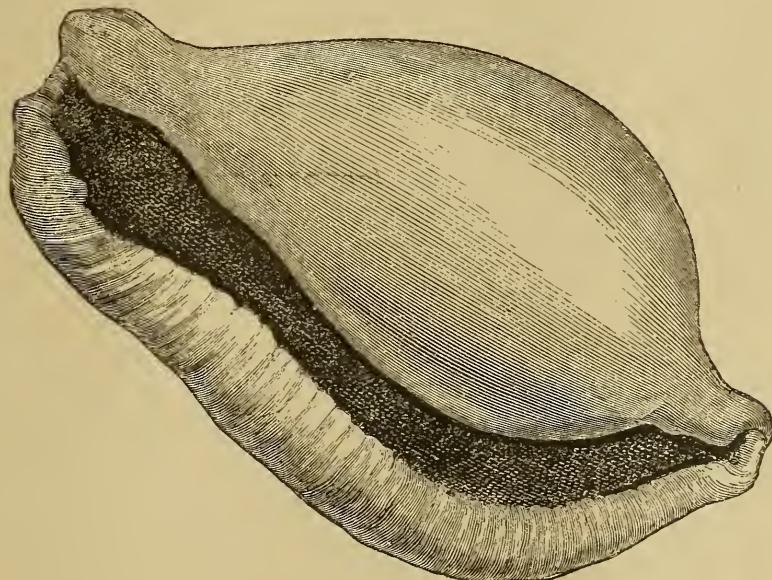
The curious little creature can also mend his beautiful shell house, which he does by the same process, of laying on a coating of animal matter, mixed with chalk, to harden it.

Perhaps you have heard of the Cowries which are used for money in India and Africa. They are small yellow shells ; here is a picture of one—on both sides. They are collected on the coast by the women, after the spring tides, heaped up in the sun, where the unfortunate little animal, of course, soon dies, and leaves his pretty house to be used for money.

There is a pretty little Cowry found on the coast of England,

which has been so lovingly described by one of her naturalists, that I must tell you about it, just to show you how much beauty can be packed in an atom of a shell, no bigger than a pea. To begin with, the shell is covered with ridges, alternately colored white and flesh color. The foot is twice the size of the shell, and is of a pale orange color. The mantle which turns up over the shell is of a light yellow color, spotted with black, and having a border of red. Its proboscis is red also, as are its tentacles, which are also specked with yellow. There, isn't that a gorgeous creature to come out of a crack in a shell no bigger than a pea!

Cowries are used for ornaments the world over. We put them in our cabinets, and cut them into cameos, while the people on the Asiatic coast make bracelets, collars, head-dresses, ornaments for boxes and harnesses of them. The New Zealanders wear them on the neck, and some African tribes adorn their hair with them.



Here is another shell, not exactly a Cowry, but the next thing to it, and so near like it that you and I can hardly find any difference. It is called the Poached Egg, because in size and color it looks very much like a nicely poached egg, as it reposes on a slice of toast. The picture is the size of life.

*HOW THEY ALL GET ON.*

How do all these creatures get on? Why, on their feet, did you say? Well, to be sure some of them do. There's your cat! She goes on her feet, and has twice as many as you, besides.

But how about the fishes? They have no feet, but you needn't pity them; they can get on ever so much faster than you can.

Then there's the snake family! They have no feet to walk, and no fins to swim. They don't lie still, though; they walk on their ribs. That's funny, but true for all that.

And there's the grasshopper! He neither walks, nor swims, nor crawls, but he's a prince of hoppers.

I can't tell you how many ways there are in which living creatures get about in the world.

I've already told you about the kangaroo, and her fearful leaps. But the kangaroo isn't the only creature that jumps. There are our little friends in green, the grasshoppers and frogs, and our little enemy in black, the flea, who is the best jumper in the world. And then there's the jerboa, a droll little fellow about the size of a rat, who lives in Africa. He jumps like a kangaroo, with his hind legs and tail.

Perhaps you'd hardly like to put your canary-bird among these hoppers; but if you let him out of his cage on the floor, you'll see he doesn't walk or run, as many birds do, but hops along with both feet at a time. Little short hops they are, and very cunning to see, but still hops.

I said snakes walk with their ribs, and so they do; but there are the soft little worms you turn up when you dig in your garden, and who are in such a desperate hurry to get back, that they slip into the ground before your very eyes. They have no ribs, yet they get on,—fast enough, too, so you can hardly catch them, if you want to. The way they do so is very curious, and we should never have known anything about it but for the microscope. First, they stick their sharp nose into the soft ground as far as they can, and then draw up the rest of the body as close as possible. All down the

sides of the soft little fellow are rows of tiny hooks, so small we can't see them, and when the body is drawn up partly into the hole, these rows of hooks spring out and fasten on to the side of the hole. So Mr. Worm gives another push with his sharp nose, the hooks hold fast, and in he goes another inch or two. Isn't that wonderful?



There's another sort of a worm, though, that goes in a very odd way. It is called the measuring worm. I dare say you've often seen it. It is about an inch long, and has two feet at each end of its body. They are tiny bits of feet, and the unfortunate worm can't walk as other four-footed creatures can. First, he fixes his fore feet in a good place, and then draws his hind feet up to them, while his body makes a loop in the air, of course. Then he takes hold with his hind feet and stretches out his length again, finding a new place to fix his fore feet. So he goes on, measuring off the inches quite fast.

I want to tell you a little story about one of these droll little worms. I once knew a young girl who always wanted to laugh just when she mustn't,—did you ever know any one who felt like her? Well, one day in church, she chanced to get a sight of a measuring worm. It was looping its way up the broadcloth back of a respectable old gentleman who sat in front of her. Of course, she was interested to see what would become of the impudent fellow, so she watched him. When he reached the top of the stiff white collar, he stopped to reconnoitre, and for a moment was undecided, but then he caught a lock of hair, and on he went, busy as ever. By this time the watcher had forgotten where she was, and was totally absorbed in the movements of the worm. Higher and higher he mounted, till he reached the broad, white top of the bald head, and on the highest point he came to a stand. Fastening his hind feet, he raised himself to his full length, turned his head this way and that, anxiously looking for a higher place to climb.

The girl was so amused with his droll air of concern that she laughed out loud! Her neighbors looked at her in horror, and she tried to appear as though she hadn't done anything.

Some little fellows that live in the sea have queer ways of getting about. Fishes, of course, swim easily around; but there's the little scallop. He lives in two of those pretty round shells, with fluted edges, that are so pretty to make pin-cushions in, and he

moves about in funny jerks, by drawing water inside of his shell, and then suddenly spouting it out.

One of his neighbors, a jelly fish, a lovely creature, shaped like an umbrella, that I have told you about, swims about in the most graceful way, by drawing in and throwing out the sea water under his umbrella.

That ugly fellow, the lobster, just slaps the water with his tail, and shoots off like a dart, while the pretty little sea urchin walks in a dignified way on hundreds of little feet, each one of which is a sort of sucker, and sticks to the rock, as I've told you.

The loveliest way of getting on in the water is used by one of the tiny atoms of creatures that we can't even see without a microscope. He is called the wheel bearer, because he has what look like two wheels, always turning very fast, and carrying him very rapidly through the water. But when those prying men began to study the little beauty with their wonderful glasses, they found out that the famous wheels were not wheels at all, but rings of hair, that bend down and fly back so regularly, that they look exactly like a fast-turning wheel.

What would you say to a fellow that always walks with his head down? I don't mean a fly on the ceiling, but an animal as large as a good-sized dog. It is the sloth, and I've told you all about him, too.

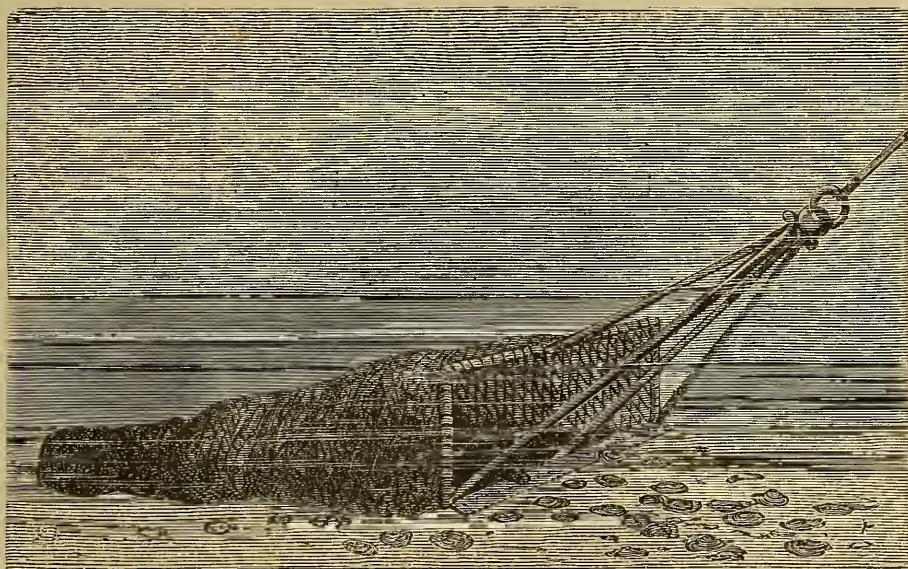
The daintiest way of getting about, for one that has no wings, is practiced by a tiny speck of a spider. She has a fancy to travel up in the air, so she throws out ever so many threads, which she spins, keeping hold of one end—of course. When there are enough to hold her up, the first breeze carries her off, and away she goes, high up in the air, quite out of sight.

Who would ever suspect a spider of going up in a balloon?

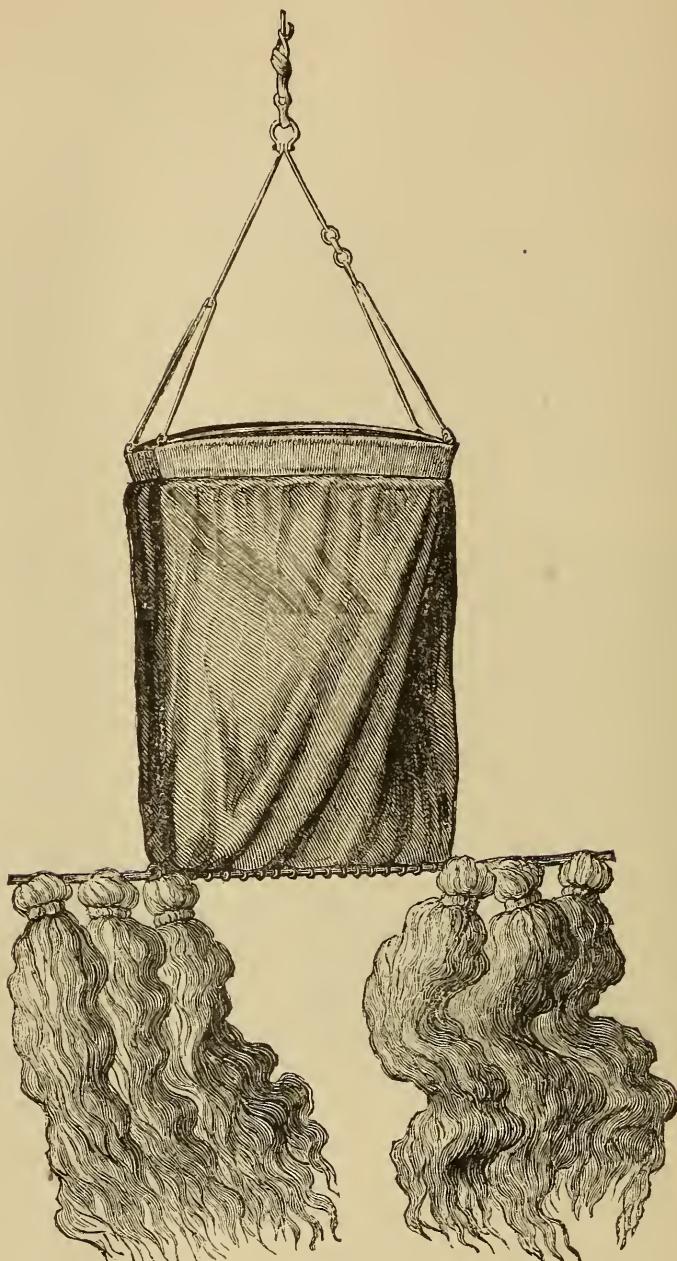
*HOW THEY ARE CAUGHT.*

I have told you various ways in which fishes are caught—as I went along—but now I want to tell you about the capture of the beautiful and wonderful creatures who live on the bottom of the sea, where lines, and nets, and harpoons, and all such things cannot reach.

It is done by the Dredge. Here is the picture of one; the common kind used in oyster catching.



It consists—as you see—of a strong net, shaped like a purse, and fastened on to a strong iron frame. The bottom of the frame is flat, like a scraper, and a scraper it is, too. The whole machine is dropped over from a ship, and dragged along the ground for a while. Of course, anything before it, not too large to get in, must be drawn up, when at last they draw the Dredge up on deck and proceed to empty it.



But such a coarse net would never do for naturalists ; many a treasure would escape through the holes. So this improved Dredge has been invented for their use.

The bunches of fringe on the bottom, are what are called tangles ; and their object is to entangle and bring up many a delicate creature which would be crushed or broken in the general mass.

When brought up from the depths of the sea, these tangles are often one mass of living creatures. I have found in some paper, a description of the hauling up of the Dredge, which is better than I can tell it to you, and I will give it to you just as I found it.

"Prof. Verrill's invention—the Cradle Sieve—is semi-cylindrical ; about three feet long, fifteen inches wide. While the Dredge is coming up, this Sieve is hung over the side of the vessel, and ultimately, the Dredge is lifted over and into the Sieve. The lower end of the Dredge net is then untied and opened, and the Dredge lifted a little, and the entire contents slide out of the net gently into the Sieve. If, now, there is no anxiety to secure without injury the very smallest and most delicate specimens, and there is no occasion for haste—perhaps to repeat the haul—the Cradle-Sieve is covered with a tight-fitting lid, lowered overboard, and allowed to drag by a tow-line in the water till the mud is washed out. If, however, there is time enough—as there usually is—a stream of water from the pump (propelled by steam power), is passed through a few lengths of hose into the Sieve while it is hanging over the ship's side. The hose in the hands of some one of the naturalists, is, of course, entirely under his control, and by moderating the force, volume and direction of the stream, he can wash out of the mud his most delicate specimens, with as much care for their safety as he chooses to devote. No one, however indifferent he may be to scientific pursuits, can escape the infectious ardor with which the naturalists crowd around the spread tarpaulin, as the contents of the Dredge, Trawl, or Tangles are brought to the deck. The spiteful little reeling engine has pulled its load up to the davit, and the practiced crew lift the burden carefully and deposit it on the sailor's table cloth—the tarpaulin. Down on their knees go the scientists around it ; this is their homage to nature. Bottles with alcohol, jars with glycerine, dishes and bowls with sea water, pails, tubs, and all kinds of receptacles are brought into requisition. The naturalists, all but one, thrust their fingers in the muddy mass, pull out their plums after the fashion of Jack Horner, announce the name of their wriggling captives, and plump them into the pot,

pail, or bottle—all but one, who sits with pencil in hand and records the names as they are called, omitting duplicates. Every few minutes, as a rare specimen is brought to light, or one respecting whose characteristics there is some mooted question, the heads crowd together over the tarpaulin, and a discussion takes place which is, in more than one sense, Greek to the uninitiated."

*HOW ALL THESE THINGS WERE FOUND OUT.*

If you don't know how it has been done, you may wonder how men found out all these facts that I've been telling you about insects, some of them not so big as the head of a pin. It has all been done by the help of the microscope ; an instrument as wonderful in revealing the small things in nature, as the telescope is in the great things. I want to tell you a few things that it shows us.

If you think small people two or three inches high are amusing, what would you think of a little creature so small as barely to be seen by the naked eye ; so small indeed, that he and thousands of others have plenty of room to live, and grow, and travel around in a tiny puddle of water ? And what sort of a house would you think such an atom of a thing could build ? What if I should tell you that he can build a brick house ; that he selects from the water in which he lives, the necessary materials, shapes them in a mold which he has in his body, and piles up a regular house for himself ? You can hardly believe it, but it is perfectly true.

What do you think of creatures so tiny that a whole family can live in the cavities in a grain of sand ? To your eye, a grain of sand looks perfectly round ; but these dots of creatures find comfortable caves to live in. How do you suppose they like it to be mixed up with water and other things, and walled up in a stone wall ? It's as bad to them as to be shut up in an enchanted palace, and worse, for no disenchanting words will let them out.

The world of wonders opened to us by the microscope is stranger than all the tales of giants, genii, and enchantment you ever heard. Think—if you can—of atoms so small that whole colonies can live in one drop of water, and swim around as freely as whales in the ocean ; and that it would take many millions of them together to be as large as the head of a pin. Imagine these specks of life swimming around in the water, chasing other creatures smaller than themselves for food. They're almost too small to think of. You would never think of looking for beauty in these little creatures, but they are most exquisitely formed and colored. Many, not so large as the head of a pin, are as perfect and beauti-

ful as a flower, and just as nicely adapted to their life, in every particular, as a human being is to his.

Many creatures in the sea look so much like flowers that in olden times they were supposed to be flowers ; but, studied by the help of the microscope, they are seen to be animals, though as beautiful in color and shape as the loveliest flowers that grow. But each one is a hungry little animal, waving around in the water, not to look pretty, but to catch something to stuff into the eager mouths they always have.

How do you suppose the sponge you have to use with your slate at school, spent his time when he was alive, before he was torn from his home for your use ? Do you see those little, very little hills on him, each one of which has a hole in it ? Well, he spent his time in drawing in the water through the other tiny holes all over him, and after he had snatched all that was good to eat, spouting it out again through these little volcanoes. Why, he made a regular fountain down there at the bottom of the sea. I wouldn't be surprised if your father wears some pieces of sponge for shirt-studs and sleeve-buttons. You ask him if he wears the fashionable "moss agates," and if he does, you just tell him it is nothing but flint, with pieces of sponge turned to stone in it.

If you've ever been to the mountains—and I hope you have—you remember seeing piles and piles of immense rocks. Many of these rocks are made entirely of the shells of some of these sea-atoms, each one no larger round than one of your hairs, but as beautiful as the large sea-shells you have seen so carefully preserved.

These curiosities of the sea take the most wonderful shapes you ever thought of. Some families look like a basket of flowers, as large as a peach-basket. Every stem of the basket is a house, in the shape of a long tube, and the flowers are only the lovely little animals' heads stuck out of their houses. Another kind is called the feather star, and looks exactly like a star made of lovely rose-colored plumes. Nothing can be more beautiful than this little star waving around in the water. Then there's the sea-moss. To the eye it seems a mere film of moss on some old stone ; but under the microscope, it turns out to be a perfect forest of little trees of various colors, and the trees are made of live creatures, throwing their arms around for food.

Do you wonder what all these mites were made for ? You may be sure that each one has his use, however humble. The wise

men have decided that these creatures are scavengers. They eat decaying animal and vegetable matter that would be very hurtful if not disposed of. These scavengers are food for larger atoms, and these, in turn, are food for fishes, and fishes are food for men. Nothing is lost.

But don't think the wonders are all in the sea. The insect world has marvels as great as the sea. Take the eggs of moths and butterflies—tiny things, not so big as the head of a pin. Why, birds' eggs can't compare with them for beauty! In color especially, they are exquisitely changeable. One egg is covered with hexagonal figures—hexagonal, you know, is six-sided—and at each corner is a tiny raised button. It is a beautiful blue and white, changeable. Another egg looks like a ripe orange; another like a beautiful round shell; some are oval, with perfectly regular figures all over; others transparent, like glass, so the little curled-up worm can be seen inside. Some have beautifully made covers, with hinges, so that the tiny creature has only to open his door to get out.

But if the eggs are interesting, the butterflies, moths, and insects are quite as much so. There's one moth with a regular finger at the end of his antenna, or feeler. Then the tongue of the butterfly is most exquisitely made to dip into flowers, being a perfect tube, through which he can suck the sweets as easily as you can suck lemonade through a straw. Butterflies' wings are covered with feathers, lapping over each other like shingles on a roof. Naturalists can take off these feathers one by one, and examine them in their microscopes.

Then there's a tiny fly which infests gooseberry bushes, called the saw-fly. Why, that atom of a creature has as perfect a saw as was ever cut out of steel—yes, a pair of them, and a convenient sheath for them in his own body, where he puts them when he don't want to use them.

Possibly you have heard that each of your hairs is a hollow tube, with a root like an onion, and that no two animals' hairs are alike; some have scales like a fish, and others have different marks.

Pretty soon there will be no secrets left in nature, since the inquisitive little microscope has begun peering into mysteries.

The naturalist just pulls off the skin of a rose-petal, puts it into his microscope, and finds out just how it lives. He finds the

little bags of paint that gives the rose its beautiful color, and in sage and mint leaves, the tiny sacks of scented oil. He fishes out of the cells of plants the most exquisite crystals ; some plants are just packed full of them. Mold and mildew, which housekeepers hate, turn out to be forests of beautiful trees, with fruit and flower. They grow in this way : The air is full of germs of vegetable life, and when they come in contact with moisture, on plants, for instance, they will just stick there, throw out little suckers into the plant, and proceed to grow at its expense.

You have seen rust spots on fruit. Some kinds look like little cups full of reddish powder ; others, that look to you like black dots, are really little brown bottles, filled with powder. Then there are the lichens, larger than mold, and not so large as moss. Some kinds of lichens, such as you've seen growing on old fences, are little baskets full of seeds. The edges of the baskets are fringed, and when the seeds are ripe the fringe bursts open and scatters the seeds.

Linnæus, who was a great botanist, calls the mosses workmen, because their work in life is to produce vegetation in newly formed countries where there is as yet no soil ; to fill and make solid, swampy land, and form a soil that larger plants can grow on.

The scale moss, growing at the foot of trees and other shady places, has a funny little box for its seeds. If this box is brought into a warm room, and a drop of water put on it, it will burst violently open and scatter the seeds in a little brown cloud, the box itself taking the form of a cross. The scattering of the seeds is caused by several little springs, coiled up among them, which writhe around like a nest of snakes.

What do you think of the idea of regular canals running through plant-leaves ? You have probably heard that the leaves drink in moisture from the air and from rain for the use of the root, but I don't believe you ever imagined there was a regular network of canals to carry the moisture down to the roots.

Do you know what the pollen of a flower is ? If you haven't studied botany, I'll tell you. It is the yellowish powder that you sometimes get on your nose when you smell of a flower too closely. Well, what seems to you like mere dust, is in truth, most beautiful little balls, figured in the oddest and prettiest way.

Nothing in nature is too small to be exquisitely made and ornamented, and the greater power we can get in the instruments,

the more beauty we can discover; even the seeds of a carrot are exquisitely shaped, like a star fish.

These inquisitive naturalists will even steal the secrets of the flower-buds, pull off their green coats and see how they are made, and how they get to be flowers. They study the diseases of wheat and corn, and I expect one of these days they'll have a remedy for every one of them. Perhaps there will be vegetable doctors, and when a farmer's corn is struck with disease or taken sick, he'll call in the doctor with his microscope and medicine box. They find out, also, about human diseases in the same way, and are already having new cures. There'll soon be an end to the terrible adulterations in food, for nothing can escape the prying little instrument. They can tell when cotton is mixed with linen or wool in goods, for the minutest thread of either is vastly different from the other. They can tell when our coffee is filled with chicory or other things, even if ground to the utmost fineness. Every substance has its own shape, and no matter how small the atoms, they retain their own shape.

Even the flour makers can't escape. They can tell wheat flour from rye, or corn, or any other grain. If a blood stain is under question, the little instrument readily tells what is human and what is animal. It is said that the microscope will even steal the written secrets from the ashes of paper. For instance: if you burn a letter and one of these searching little instruments is applied to the ashes, words can be read and figures made out.

Before I stop, I must tell you a nice little feat lately performed by the microscope by help of photography. While Paris was in a state of siege, not long ago, no papers or letters were allowed to go into the city, so the people could know very little of what was going on in the world. Friends who were outside and longed to write to them put their wits together, and this was the result. They had printed, in the *London Times*, their letters and messages to their friends, and then they had the *Times* photographed. One page of the *Times*, which is as large as our large dailies, was photographed on very thin paper, about as large as a postage stamp. This tiny photograph was sent to a town where carrier pigeons were sent to Paris. You know that carrier pigeons that were brought up in Paris may be taken anywhere away, and, when liberated, they will at once return to their homes in Paris. Well, these tiny photographs were tied to the pigeons and sent off. Arrived

in Paris, one had only to take a microscope to read all the news with ease. But as there were too many waiting to read to be satisfied in that way, the photograph was put into a magic lantern, which makes things look larger, you know, and thrown on to a screen. Clerks were employed to copy the messages and letters, and send them out to be read.

Perhaps some day, our books will be photographed, and we will read them with microscopic spectacles. We cannot predict to what results this peering into nature will lead us. But, undoubtedly, the more we see of its mysteries, the more we shall admire and wonder.

*EATING ALL OVER THE WORLD.*

What would you think to see on a dinner table a whole peacock, with head, feathers, tail and all? And not only peacocks, but ducks and geese, and even sober old hens, all dressed in their own feathers?

In old times, that was a great triumph in a cook's art. I'll tell you how it was done. The peacock—or other fowl—being killed, was handed over to the cook, who proceeded to skin it very carefully, so as not to disturb the feathers. The head and tail were of course left on. The skin was then spread out and rubbed with spices, while the body was stuffed and roasted. When it was done, it was sewed up in its own skin and served. A table thus ornamented must have been a funny sight. But I don't know that it was any more odd than a hog roasted whole, which they have in the South Sea Islands. Having no ovens large enough for such work, they dig a pit in the ground, wall it with stones, and build a fire in it. When the stones are hot, they rake out the fire and put in the hog, dressed and stuffed, and wrapped in plantain leaves. Then they cover him with a blanket of hot coals, and over that a thick quilt of earth. He simmers away for several hours, and comes out a great and delicious feast.

In old times, in England, before the days of railroads, telegraphs, and common schools, when few men could write their own names, and books were too rare to be owned by any but the very rich, people spent most of their time in eating and fighting. Eating, or rather feasting, seemed to be thought the chief end of man. The number and variety of their dishes, is wonderful to us, who have so much else to do, and spend so little time in eating. History tells of a wedding feast, at which there were thirty thousand different dishes served. And King Richard I. of England had three hundred persons employed in his kitchen. At one feast, the great attraction was four big roast pigs, harnessed with ropes of sausage, to a monstrous pudding. One man had ponds in his grounds, filled with expensive drinks; and another built resting places on the public road, and supplied a large caldron in each,

with fresh food each day, for the entertainment of travelers. Now-a-days, people can find better use for money than spending so much for food.

If you should travel round the world, you would learn to eat your dinner in a good many ways. In Turkey you would learn to sit on the floor, cross-legged, and eat your dinner off a round tray, without knives or forks, plates, glasses, or napkins. All the guests eat with their fingers out of the same dish. If you dined with the Arabs, you would see no knives or forks, and if your host offered you a choice bit of meat, you would be expected to open your mouth, and let him put it in. The Arabs use only the right hand in eating, and what is still more funny, they will pull apart or carve turkeys and fowls with only one hand, and without a knife. If it is hard to separate, one of the guests will lend his right hand. In Siam you would be treated to ant's eggs, and Burmah to locusts, stuffed and fried. All you young folks would like to eat in Japan, for they serve candies and sweet things very often, and what you can't eat you are expected to take home. At grand feasts, guests are expected to bring servants, with baskets, to take home the leavings. In Abyssinia, it is a mark of good breeding to smack your lips while eating, and I'm sure you'll not be surprised to hear that they eat their meat raw. In South America, you would eat lizards and snakes, and among our American Indians, you would be treated to roasted grasshoppers. In Otaheite, you would have your dinner alone, in a basket, and if you were in the fashion, you would sit down on the floor, turn your back to everybody, and eat. It is there considered very improper to eat with others. Snails and horseflesh would greet you in France. But the funniest dish you would see, I guess, would be in China, where they serve up little crabs—*alive!* Just as they sit down to dinner, the tiny crabs are put into a dish of vinegar, which makes them very lively. Then they are put into a covered dish and placed on the table. When every one is ready, the cover is snatched off, and instantly the table is covered with scampering crablets, running for their lives. Now comes the fun. The guests take both hands, grab right and left, and stuff into their mouths these lively wriggling crabs, and eat them down with great relish. I don't think I would like to partake of that dish, though perhaps you would.

While you're on your journey, perhaps you'd like to "skip" New Caledonia. For there—if they were at all polite to you—

they would serve up roasted or even raw—*spiders*. “Horrid!” did you say? Well, it does seem disgusting to us, but people who have eaten them, say they are delicious, and taste like nuts. I’ve read of one young lady, in Europe, who never saw a spider in its web but she caught it, and ate it at once, as you would a cherry. I don’t know that spiders are any worse than grubs, which are great fat worms, as big as a man’s thumb. In India, you would see them roasted, and served instead of fruit, at desert. In some parts they add caterpillars to their dainties.

Would you fancy eating roasted ants by handfuls, as you eat sugar plums? They taste like sweetened cream, so travelers say—I never tried them. But really, when you come to think of it, none of these insects that we consider so disgusting and horrible, look any worse than lobsters and crabs, which we eat freely. It is a good deal a matter of fashion after all, and I dare say, if you had been brought up in India you would enjoy digging up a centipede, eighteen inches long, and eating it, like a stick of candy, as the children do there, according to Humboldt.

But I won’t say another word about it; partly because I don’t want to make you quite sick, and partly because that really is the very worst thing I ever heard of.

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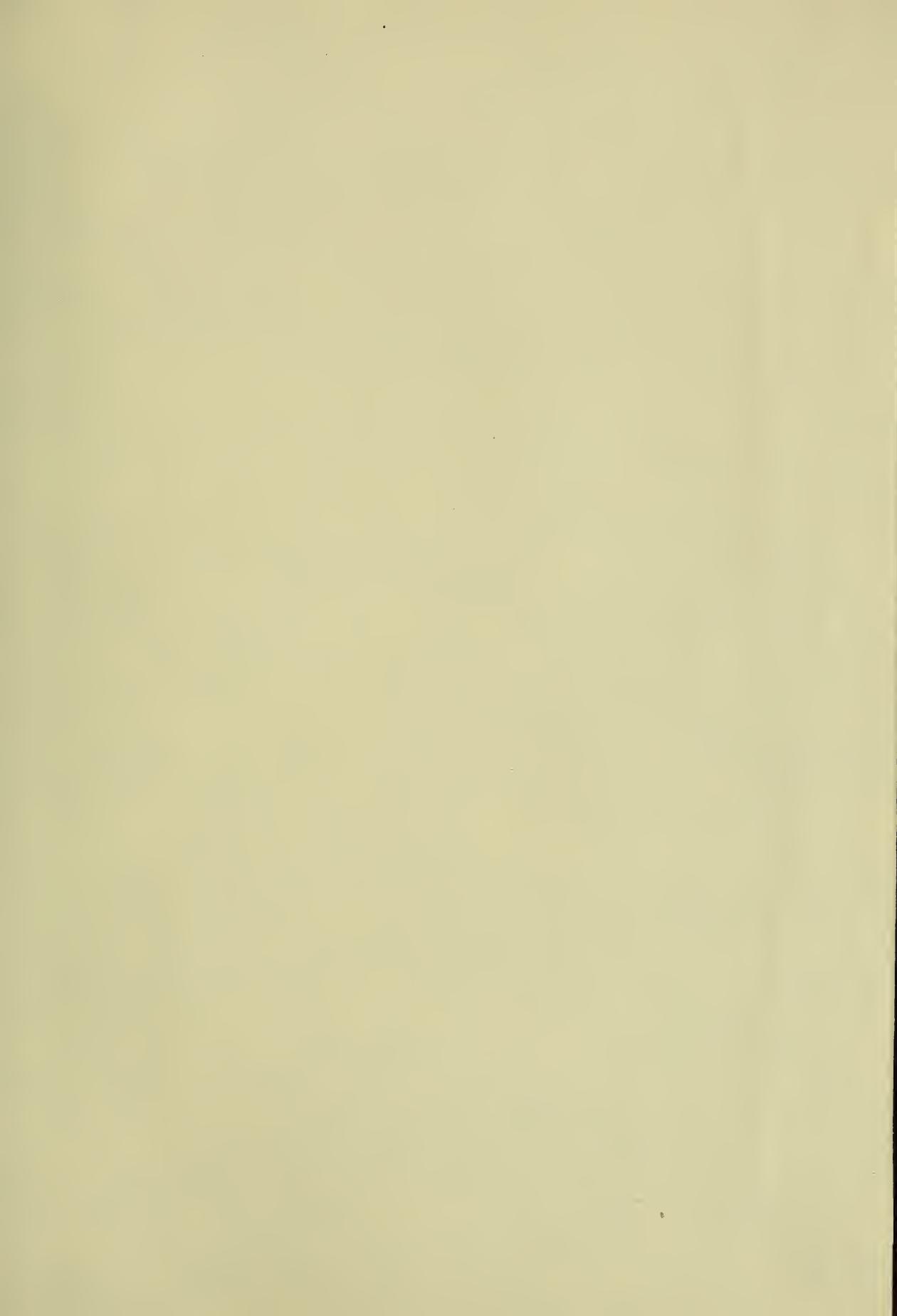
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